Rubber Journal and International Plastics

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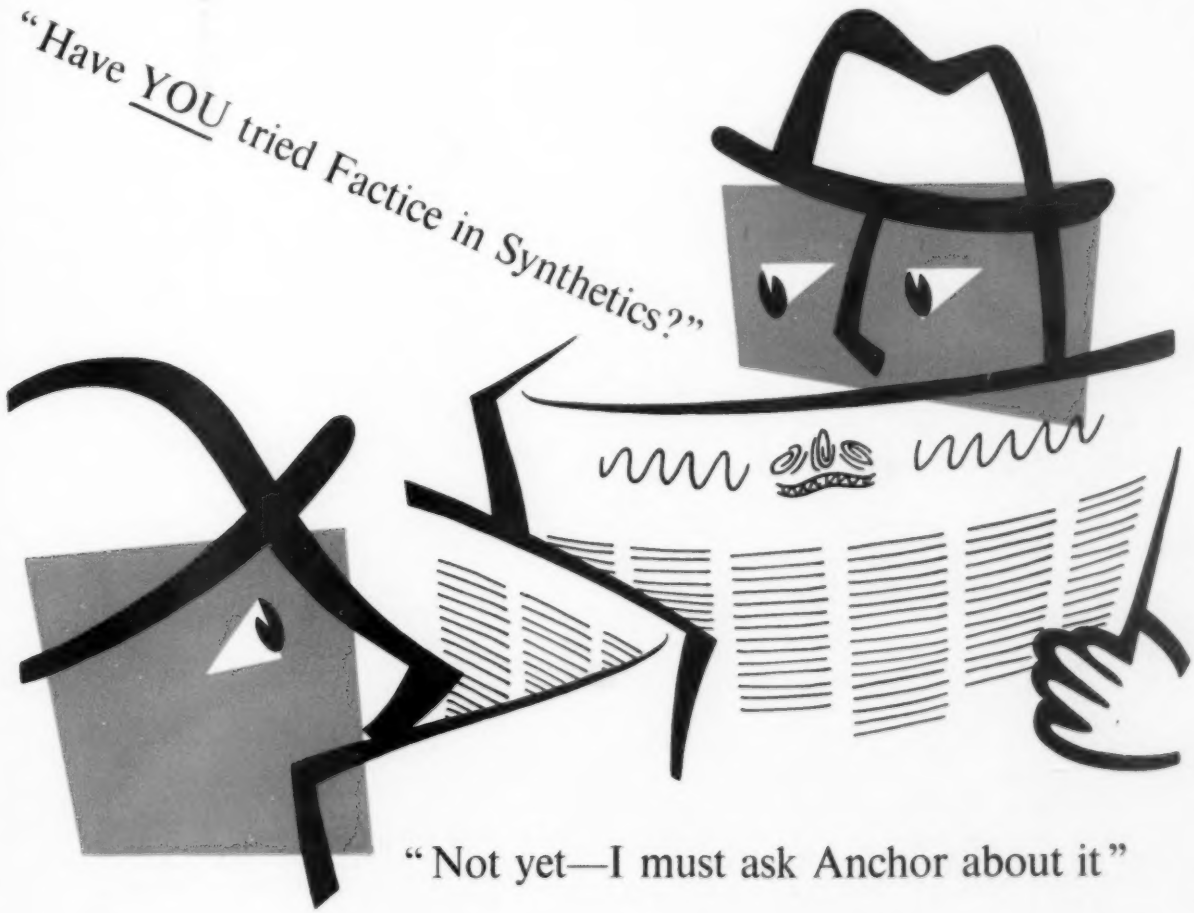

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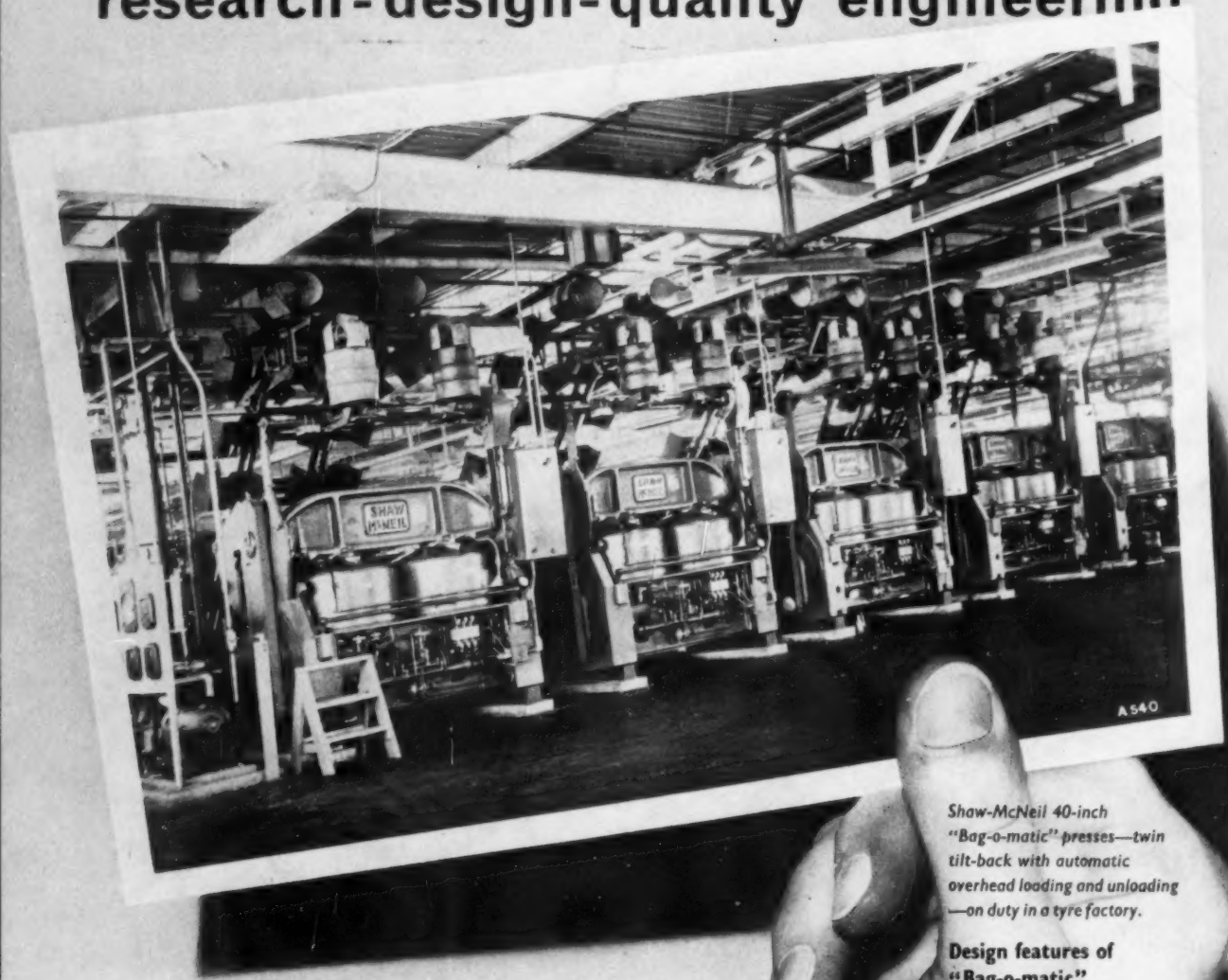

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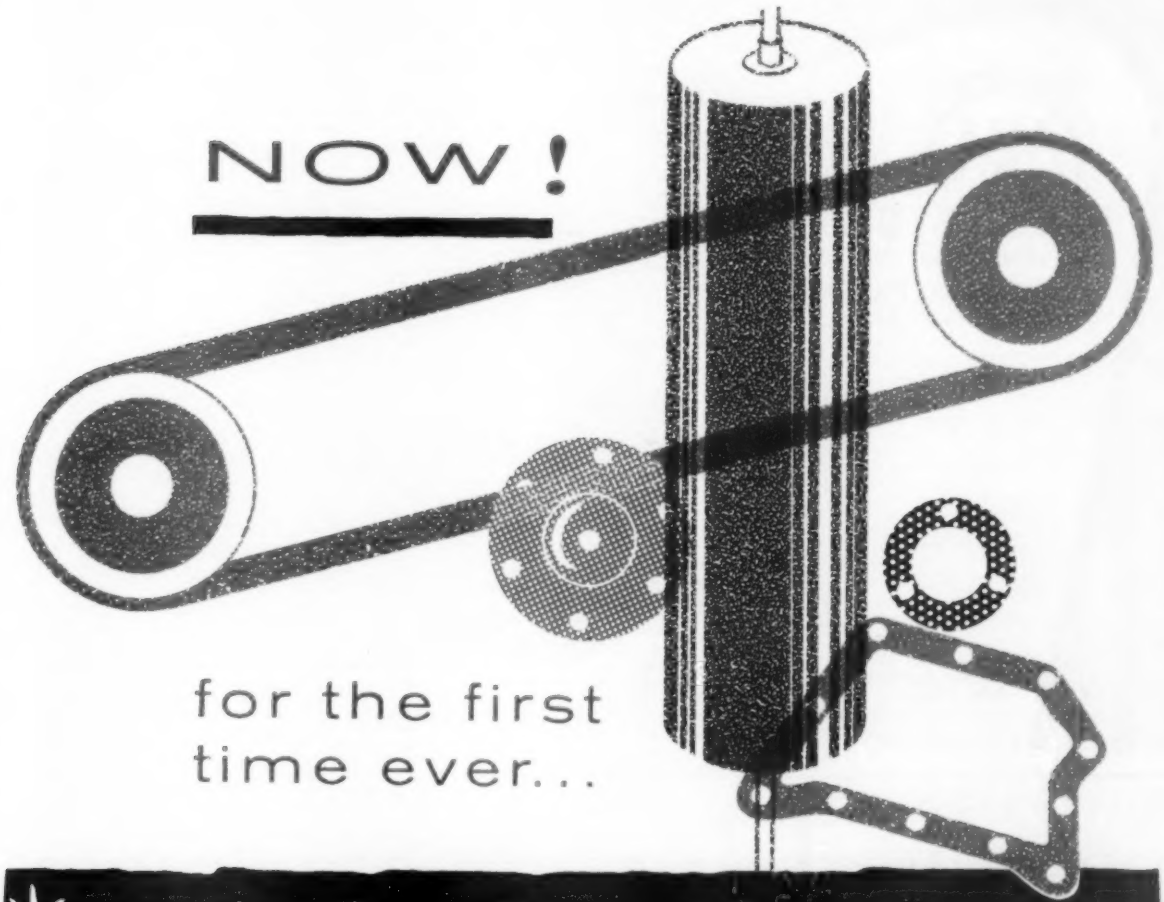

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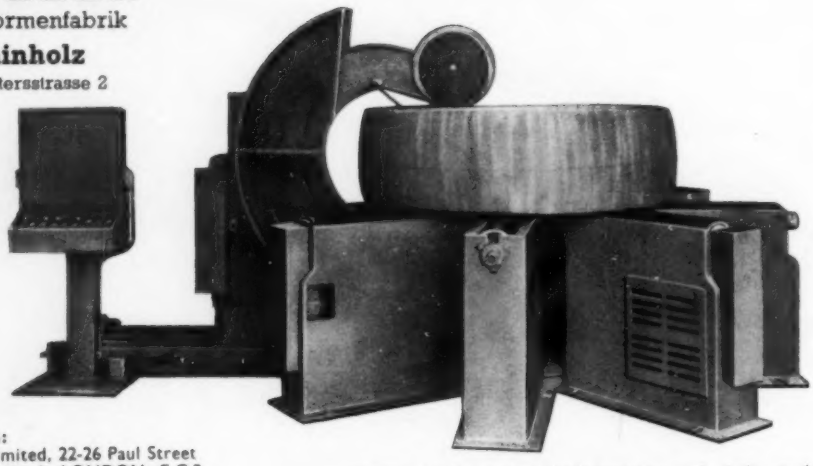

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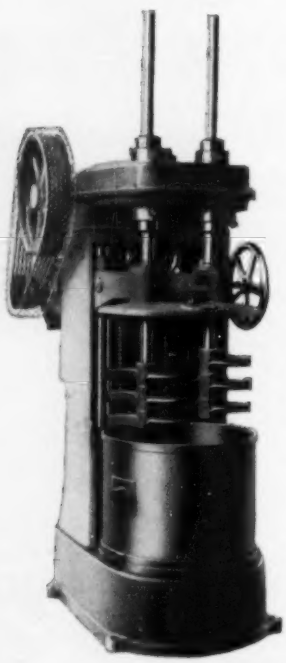

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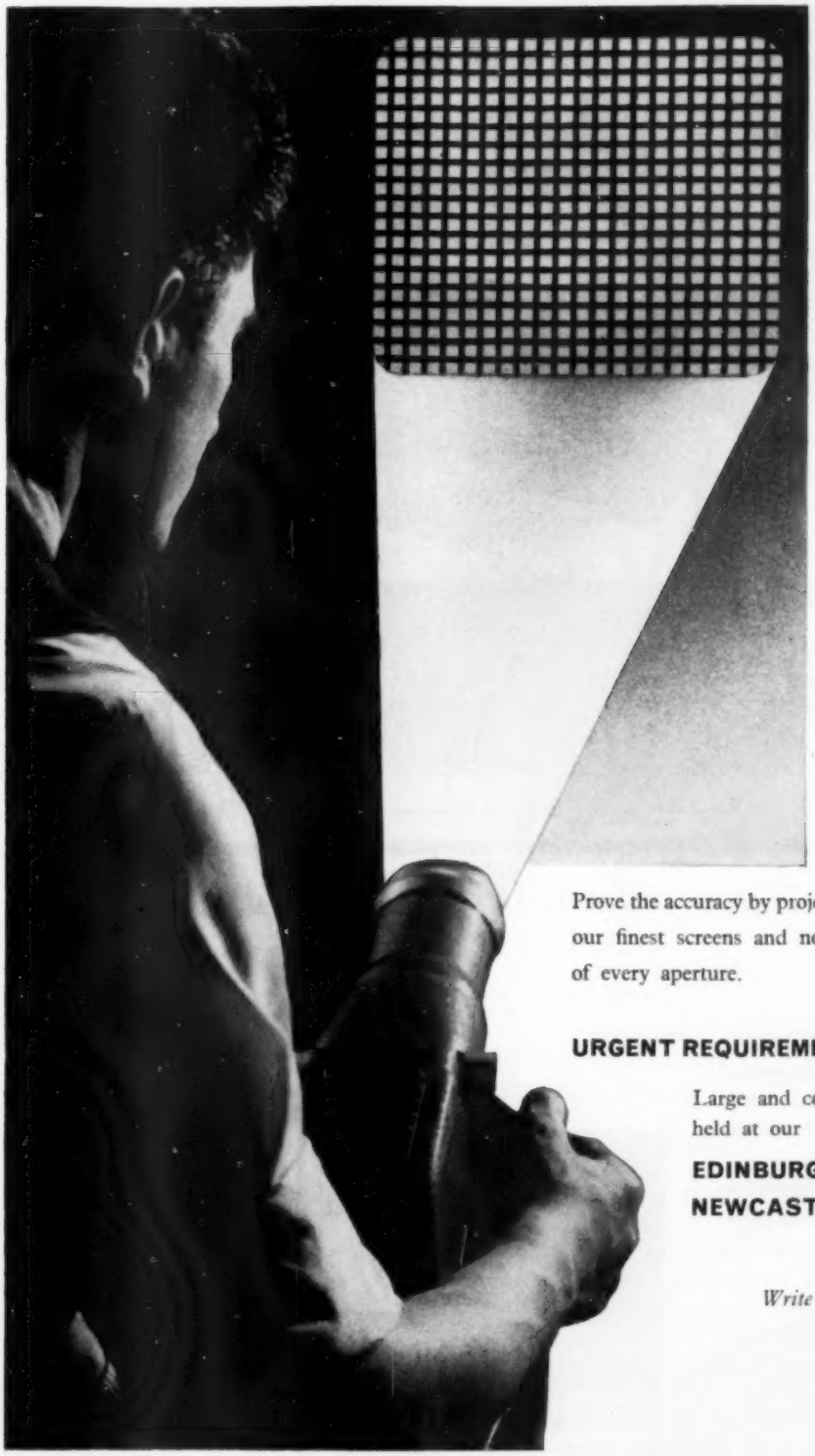

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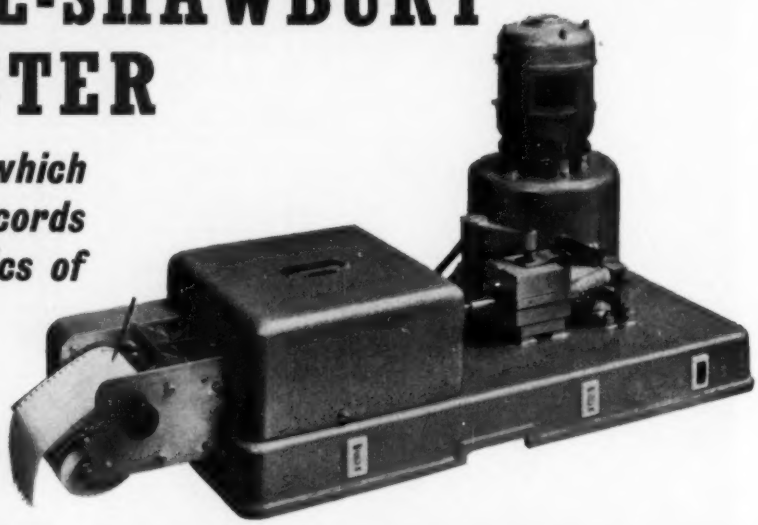

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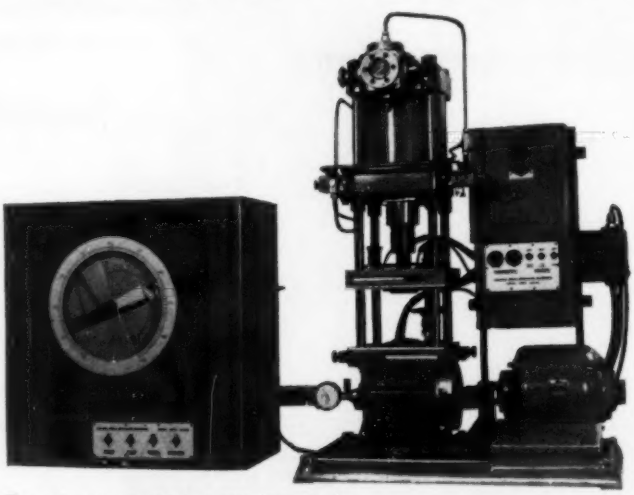

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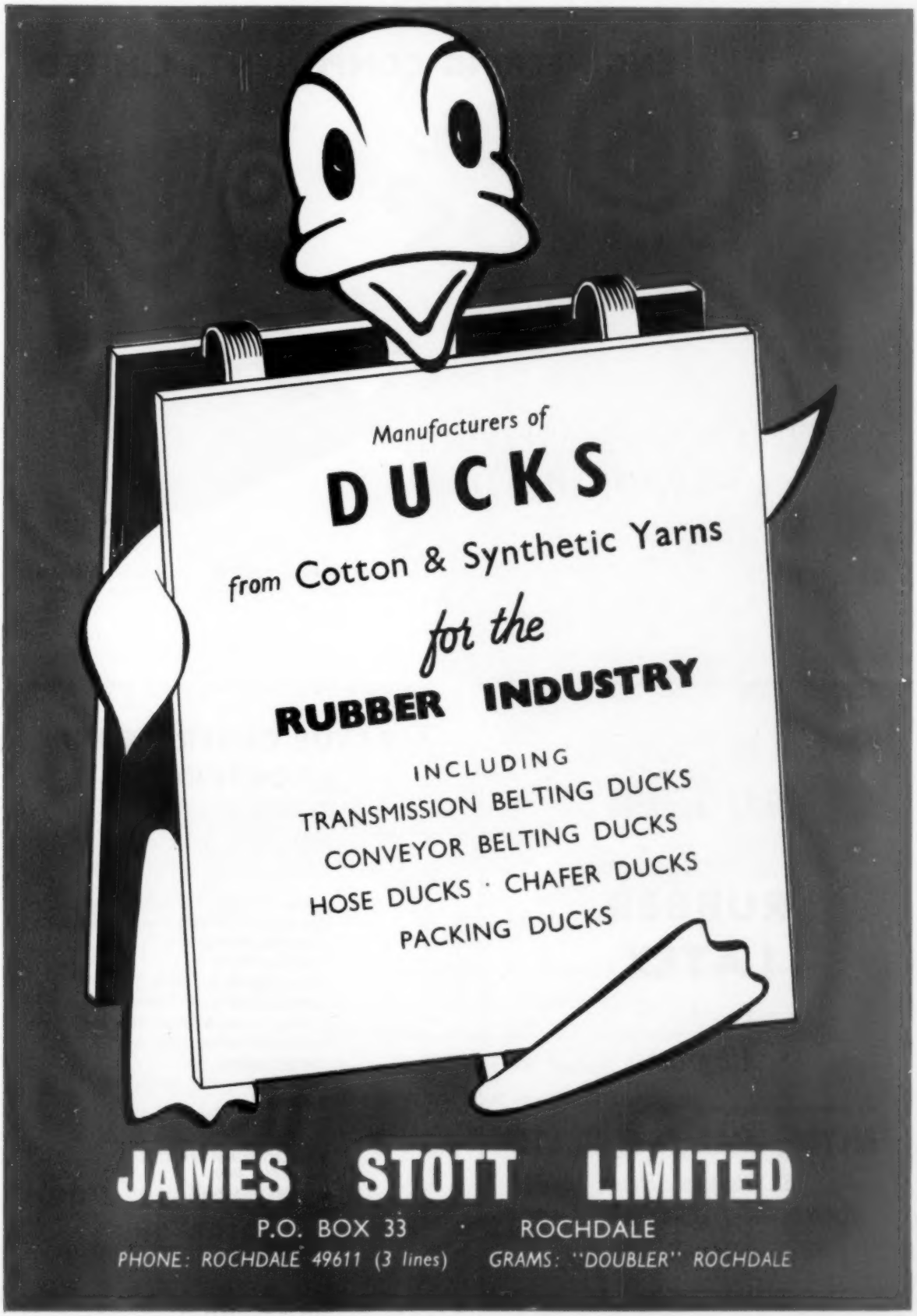
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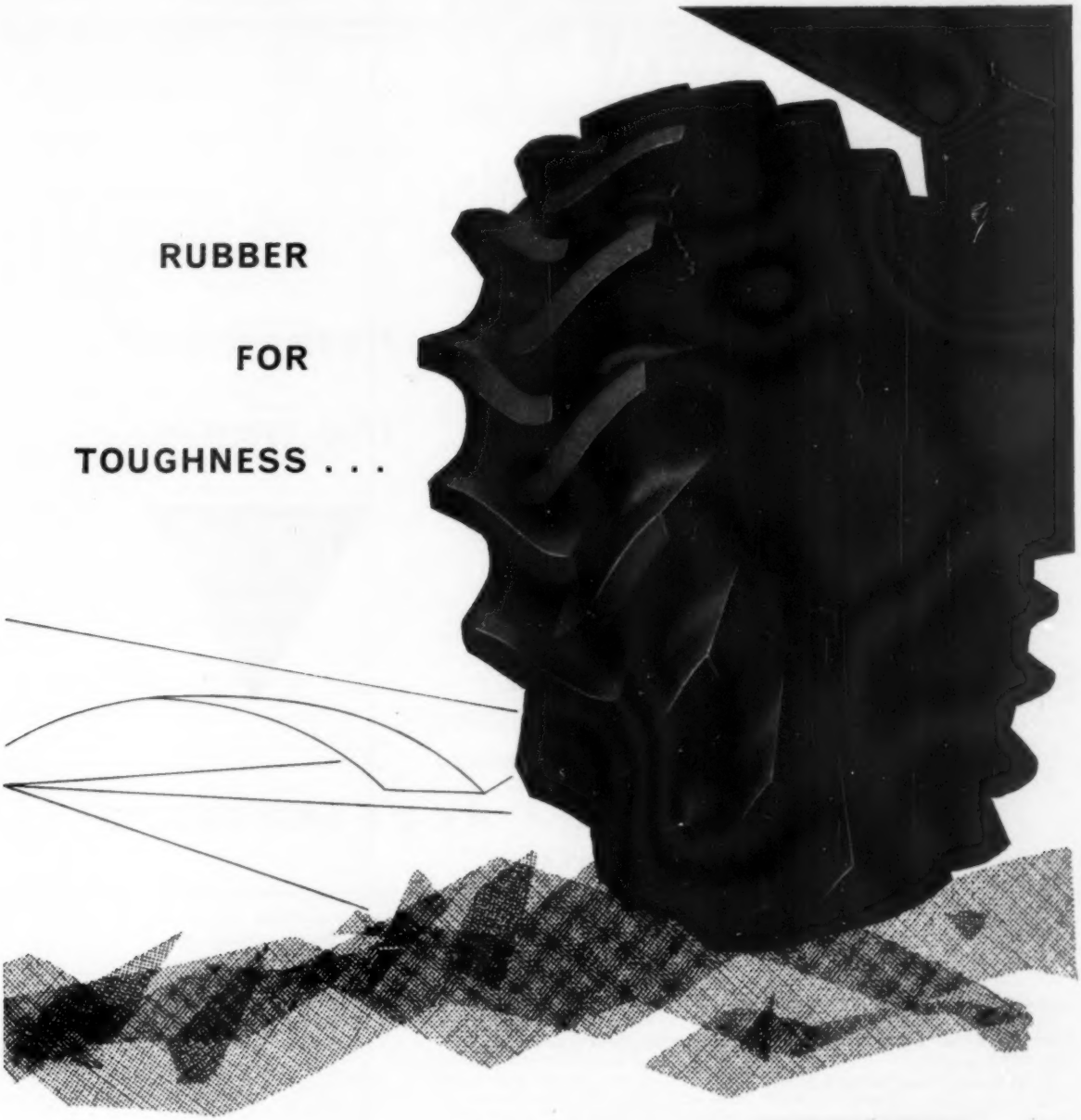

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IN ITS 76th YEAR

April 16 1960

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NOTES of the WEEK

Price Resale Maintenance

THE end of resale price maintenance is perhaps already in sight. This is the opinion reached in an interesting article in the current issue of the Birmingham and West Midlands Chambers of Commerce Journal by Mr R. C. Hiam, general sales manager of the Tyre Division of the Dunlop Rubber Co. Ltd. In describing the reasons for price maintenance and some of the arguments against it, Mr Hiam makes the point that price maintenance has no necessary connexion whatever with monopoly, price rings, profiteering or with any other of those commercial phenomena about the undesirability of which there is general agreement. So far as monopoly in particular is concerned, price maintenance may even be incompatible with it. The monopolist need only concern himself with the price he charges to the dealer. What the dealer charges thereafter is of little or no interest to him.

It is possible, of course, that price maintenance can be associated with a price ring or with profiteering, but there is no special reason why it should be.

In the Tyre Industry

POINTING out that because businesses vary, the reasons for a price maintenance policy vary, too, Mr Hiam goes on to discuss the considerations which apply particularly to his own industry. As with other enterprises, success is governed by the extent to which customers are pleased, which means, among other things, that products must be stocked where customers can buy them.

'Tyres,' writes Mr Hiam, 'are tricky things. To handle and service them properly the dealer needs skilled staff. He needs equipment, like jacks, air compressors, balancing machines and so on, as well as a fair amount of space. He must be able and willing to give advice and to make repairs. To do his job properly he must carry a fairly heavy stock, not all of which will turn over quickly. In other words, he must be a specialist.

'Unless he is given the protection of fixed margins, such a dealer cannot possibly compete with the merchant who stocks only the quick-selling lines and who considers his job done when he has handed the goods over the counter and collected the cash.

'What the critics of price maintenance all too often seem to want are *uneconomically* low prices. These are, of course, very agreeable to the customers, but they do not last. Outside the realm of academic and political mythology, it appears likely that this is generally understood.'

On the case against price resale maintenance, Mr Hiam quotes the argument that dealer establishments which can perform their function more efficiently should be able to pass on the benefits of their efficiency to the public. Another argument is that a customer ought to be free to choose whether he will have a minimum service at a low price or more service at a higher. Concluding a very fair survey of the problem, Mr Hiam mentions that it may soon be merely academic, and not only because the Government is reportedly considering legislation to ban price maintenance. Whether such a ban would lead to any lasting benefit to the customer, he ends, remains to be seen.

Phenol Price Fixing

LAST week the Restrictive Practices Court declared the price-fixing agreement between members of the Phenol Producers' Association to be contrary to the public interest. In the Court's view the four main features of the price-fixing scheme were: the fixed price was substantially above the level at which the price would tend to settle in the absence of any agreement; the price chosen was not limited by reference to any figures of cost of production; the scheme was a rigid one and the Association 'charged what the traffic would bear.' One of the Association's contentions was that there was now an excess of supply over demand and that this would increase in the near future and persist for about five years. The Court's view on this was that 'the effective reason for the increase in supply has been the rapid and on the whole steady increase in the demand for phenol, especially for the growing plastics industry. Two of the large synthetic producers are outside the Association and are making, at any rate, some sales below the fixed price.'

Interestingly enough, on the same day, the Court confirmed the findings made in the Spinners' case that, as a general rule, price stabilization as an alternative to a free market was not a benefit to the public.

The total production of phenol this year is estimated to be 54,000 tons, of which some 40,000 will be synthetic. Natural phenol is produced from coal tar. Synthetic can be synthesized from benzene or, as in the new British Hydrocarbon Chemicals' plant at Grangemouth (*RJIP*, April 2 1960) from cumene, a reaction product of benzene and propylene.

NEWS *Briefs*

DOW POLYSTYRENE IN GREECE—JAPANESE SBR PROGRAMME—UK PLASTICS FIGURES UP—RESIN CO. FORMED IN AUSTRALIA—DUTCH ACTIVITY

●**Holland**—N. V. Chemische Industrie AKU-Goodrich have announced that their range of synthetic rubbers will be sold in the UK under the trade name CAGO. They comprise nitrile latices, SBR latices and high styrene resins. Handling agents in the UK will be Durham Raw Materials.

●**Malaya**—An official cable to the Office of the Trade Commissioner for Singapore in the United Kingdom, gives preliminary total ocean shipments of rubber from Malaya for March 1960 as 93,122 tons.

●**Italy**—The Italian Ministry of Transport has asked for tenders for the sale of 1,000 tons of natural crude RSS rubber from the Government stockpile. The release is not open to overseas bid and the goods are not exportable. Late last month 1,500 tons of rubber were sold by public tender.

●**Holland** — The Aku-Goodrich synthetic rubber plant at Arnhem is to be expanded substantially, the management has announced. The plant, opened last summer, is owned jointly by the Dutch Aku Rayon Concern and the American B. F. Goodrich Rubber Company of Akron, Ohio. It produces various grades of special purpose synthetic rubber. The announcement said the expansion was planned because of the favourable development of the joint company's sales.

●**Holland**—Vredestein International, a leading Dutch tyre producer, has announced that it had recently secured a Turkish order for motor car tyres worth $730,000. This order brings total Vredestein exports to Turkey since the beginning of 1959 up to 16 million guilders, it was stated. The company claimed that at present 32% of all Turkish cars had Vredestein tyres.

●**United States** — 9,371,000 motor car tyres were produced in February, announces the US Rubber Manufacturers Association. Truck and bus tyres amounted to 1,401,000, and 4,093,000 motor car, cycle, truck and bus inner tubes were manufactured.

●**Australia**—Hercules Powder Co. (Australia) Pty. Ltd. has been formed to manufacture resin derivatives and other industrial chemicals. Forming companies are Reichold Chemical (Australia) and Hercules Powder Co. (USA). The company will operate from Melbourne, where Reichold have a resin plant.

●**Argentine**—Shipments reported this week from the Buenos Aires casein market totalled 1,357.5 tons comprising UK 660 tons, Sweden 220, USA 150, Japan 90, Mexico 81, Germany 70, Italy 40, Holland 37.5, Brazil 5, South Africa 2, Singapore 2.

●**Greece** — Dow Chemical Co. of USA is said to be preparing plans with a Greek firm for production of polystyrene in Greece. This is one of a number of projects said to be in the planning stage in the country: the Greek Bureau for Industrial Development.

●**Canada** — Canadian Defence Production Minister Raymond O'Hurley has announced that the Polymer Corporation had net income of $3,690,000 in 1959, after taxes, down slightly from previous year. Mr O'Hurley noted that decline in income was mainly due to the strike that shut-down operations at Sarnia for more than three months last year. During 1959, Polymer's capital expenditures amounted to $2,703,000.

●**United Kingdom**—Exports of plastics materials for February were 13,934 tons valued at £3,481,664, according to Board of Trade figures. This is an increase of 1,459 tons and £563,000 over February 1958. Imports of plastics materials were nearly double the figure for February 1958.

●**Japan** — Bridgestone Tire Co., Tokyo is reported to be intending increasing its present monthly output of 400 tons of foam rubber to 800 tons. The firm is building a new plant at Yokohama. Last year Japanese foam rubber production was almost double the 1958 production figure.

●**Japan**—The Japan Synthetic Rubber Co. is to increase synthetic capacity to 90,000 tons annually by 1963 and to 105,000 tons by 1965. The programme will cost 22,300m. yen and includes the construction of plants to produce new types of synthetic. The company is in technical co-operation with Goodyear.

●**United Kingdom**—The Board of Trade is considering whether PVC sheeting—in this context the term includes plates, sheets, strips, film and foil—should be required to bear a mark of origin at the time of importation.

'Chief chemist, eh? — and one day I suppose you hope to open a shop of your own!'—480

More Activity from I.C.I.

EXTENSIONS TO AMMONIA AND METHANOL PLANTS

LARGE additions are to be made to I.C.I.'s plants for manufacturing ammonia and methanol and for making products from ammonia.

The I.C.I. methanol plant at Heysham, Lancashire is to be extended. A new plant to make 30,000 tons of methanol a year began production there only a few months ago. A further extension to make 45,000 tons a year is now to be built. It is expected to be completed during 1962.

The investment at Heysham is not disclosed—which may point to developments being made outside the company's announcement. Such a development may be that of resins from the polymerization of formaldehyde, which is the main outlet for methanol. 1,200 people are employed at the plant, and I.C.I. say that the additional capacity will not make much difference to this figure as production will be streamlined and there will, for the most part, be a redistribution of the existing labour force.

Methanol is an important intermediate for phenolic and other resins (via formaldehyde). The £5m development plan announced recently by British Hydrocarbon Chemicals included a methanol plant at Grangemouth which is expected to start producing next year (*RJIP* March 19).

A new ammonia plant, with a capacity of 100,000 tons a year, and associated plants to make urea and fertilizers will be built at I.C.I.'s Severnside works in South Gloucestershire, at a cost of upwards of £10m. These plants are expected to start production during 1963. This is the second important project that I.C.I. has decided to locate on this new 1,000-acre Severnside site. The first involves the construction of plants to make ethylene oxide and ethylene glycol, costing £5m. (*RJIP* February 20).

Polypropylene Stoppers

Containers and Closures Ltd.—one of the largest bottle stopper manufacturers in the UK—are moulding stoppers in Shell's 'Carlona' polypropylene. From the bottler's point of view, Shell say, one of the most important properties of polypropylene is that it easily withstands sterilization and can be boiled for long periods. Also, the mouldings have a high gloss finish, are non-porous and do not attract dust, dirt or stains.

The colour of the screw base is ivory white but medallions in any colour to incorporate the product name or any other slogan are being inserted into the top. The medallions are moulded in Shell Chemical's 'Carinex' TGH grades of polystyrene.

Polyester Price Up

The present short supply of maleic and phthalic anhydride has led to announced price increases this week of up to 7½% on some finished products incorporating polyester resins.

G. R. T. Langford-Allen has been appointed general manager and director of Palmer's Reinforced Plastics Ltd., of Beckenham, Kent. This company—which is a member of the Tilling Group—was formed recently to manufacture reinforced plastics of all kinds.

Dunlop Sell Interests

Dunlop clothing interests have been sold to a group which includes the Charterhouse Industrial Development Co. Ltd. and William Lemkin, C.B.E. The companies involved are Chas. Macintosh and Co. Ltd., Dunlop Clothing and Weatherproofs, Ltd. and S. L. and M. Feathers, Ltd., the manufacturers of a wide range of rainwear and clothing. Over the years, Dunlop says, 'these businesses have moved outside the field of activities in which it is Dunlop policy to be permanently engaged.'

Mr Lemkin has for many years been responsible for the Dunlop Clothing interests. During the last war he was Director of Cotton Textiles Production and also Director of Clothing and Textiles at the Ministry of Supply. In 1946 he was created a C.B.E. for his services during the war. He will be chairman and managing director of the three companies.

Liquidators have been appointed for Crosby Foam Products, of Milltown, Glossop.

Monsanto Buy Flamingo Foam

An agreement with A/S Flamingo Foam, of Copenhagen, Denmark, for the purchase of its British subsidiary, Flamingo Foam Ltd. is announced by Monsanto Chemicals Ltd. The Danish company manufactures foamed polystyrene board, a widely used thermal insulation material, which is imported and marketed in Britain by Flamingo Foam. Under the terms of the agreement Flamingo Foam will now manufacture and market its own insulating board in Britain.

Mr Gilbert Dodd, who has wide experience in the plastics and allied industries, has assumed full responsibility for the development and management of this new operation in addition to his present activities with Monsanto and as a director of R. H. Cole and Co. Ltd.

The insulating board will be made at various key centres in the UK. The first factory will be in the London area, and it is expected that it will be in production during the second half of 1960. Supplies of the necessary raw materials—expandable polystyrene beads—are already available from Monsanto, which, in order to meet the increased demand for this product, is building a new manufacturing plant at its Newport factory. This is expected to come into production around the middle of 1960.

The Danish Flamingo Foam company will continue to supply technical information on development and new techniques to Flamingo Foam Ltd. Lightweight foamed polystyrene board is in growing demand for a wide range of thermal insulation purposes. One of its major uses is in the insulation of factory and domestic buildings, and another important outlet is as an insulating material in cold stores and refrigeration plant.

GSA Rubber Sales

The General Services Administration has announced that March sales of crude natural rubber from the US national stockpile totalled 10,073 long tons. The agency said that with the March sales the quantity of rubber sold since the disposal programme began on October 16 1959 was 57,629 long tons.

GSA listed the total tonnage of rubber available by grade on the current rotation schedule in long tons: Ribbed smoked sheets: 1 RSS, 28,293; 2 RSS, 2,082; 3 RSS 6,130; 4 RSS, 938; 5 RSS, 399. Thin crepe: 1X thin crepe, 3,556; 1 thin crepe, 10,635; 2 thin crepe, 1,632; 3 thin crepe, 252. Thick crepe: 1X thick crepe, 1,226; 1 thick crepe, 3,625; 2 thick crepe, 447. Liberian select A, 3,152. Liberian regular A, 1,027. Liberian other grades, 160.

Polymerization and Petrochemical Development

MORE PAPERS GIVEN AT POLYMERIC PROGRESS CONFERENCE

THE last two papers delivered on the first day of Polymeric Progress, the international conference organized by the Plastics Institute, were 'A New Polymerization Technique with Ziegler Catalysts' by Dr G. Bier (Farbwerke Hoechst AG) and 'The Impact of Petrochemical Development on the Plastics Industry' by Dr H. M. Stanley (Distillers Ltd.).

Dr Bier began by listing various published variants of the Ziegler catalyst and settled down to compare the polymerization of propylene with the Natta catalyst and with an alternative system which he refused to specify, so detracting greatly from the value of his paper. The DP of the polymer was temperature dependent using the modified catalyst, giving higher molecular weights at high conversions and low temperatures. This was attributed to a much longer 'growth period' than that indicated by Natta for his systems. A reaction sequence was suggested which is similar to that put forward by Natta with the exception of an alternative disproportionation in the termination step. Evidence for this was adduced from the high dependence of rate on time, temperature, monomer concentration and titanium catalyst concentration in contrast to the Natta system which is little affected by these variables. Subsidiary experiments were described in which propylene monomer was removed at various stages of the reaction by passing nitrogen through the reactants, the effect being to prevent disproportionation. It was also demonstrated that hydrogen gas may act as a transfer agent this being demonstrated in the presence of nitrogen (*i.e.* absence of monomer).

Dr Bier suggested that this indicated the presence of 'living molecules' although the use of this term to describe these entities was vigorously attacked by a number of speakers in the ensuing discussion.

A practical result of this low propagation sequence is the ability to produce block copolymers

~~AAAAABBBBBBAAAAA~~ etc.

by presenting monomers A and B alternately to the reaction mixture at say 10 or 20 minute intervals during the growth of the chains. Unless steps are taken to remove residual A or B at the end of each period, however, the 'blocks' will be connected together with short lengths of random copolymer chain:

block | random | block | random | block

~~AAAAAAA BABBAA BBBBBBB ABBABAAB AAAAAA~~

Therefore, further requirements for the production of 'pure' block copolymers were the use of low concentrations of monomer and easy removal of each monomer from the reaction mixture.

The remainder of the lecture was devoted to a short summary of the range of physical properties shown by the new materials which include a 'high impact' 10% ethylene-propylene copolymer. Fields of application for 'periodcal' polymers include: bottles, film with maintained impact-strength, cable insulation, etc.

Dr J. J. P. Staudinger opened the discussion. Reference was made to the surprising differences in (for example) impact strength between mixtures and block copolymers of ethylene and propylene. Doubt was cast on the ability to distinguish between the two disproportionation mechanisms given in the lecture and it was pointed out that sensitivity of the catalyst to a wide range of process variables, while giving product versatility, might make the system difficult to use industrially. It appeared that further work would be needed to elucidate the stereo structure of the new polymers.

Dr Stanley's paper was a severely practical one which summarized very fully our present obligations to the industrial chemists. There are three main methods of using petroleum as a raw material:

(1) *Cracking* which yields acetylene, ethylene, propylene, isobutene, n-butenes, butadiene.
(2) *Hydrofining* giving benzene, ethyl benzene (→ styrene), xylenes, etc.
(3) *Separation* of n-butane (→ butadiene), cyclohexane (→ nylon intermediates), pentane (→ amyl alcohol), aromatics, etc.

The principal conversion routes of some of these into raw materials for the industry was shown diagrammatically: *Acetylene* yields vinyl acetate, acrylonitrile, vinyl chloride, chloroprene, vinyl toluene and acrylates.

Ethylene yields PE, vinyl chloride (via $etCl_2$), styrene and PS (via EtPh), alkyds and polyesters (via ethylene oxide and glycol), cellulose acetate (via ethanol or acetaldehyde and acetic acid).

Propylene yields polypropylene, methacrylates (via isopropanol and acetone), acrylonitrile (via acrolein), phenol (via cumene), glycols (via propylene oxide), allyl alcohol and glycerol.

Isobutene yields butyl rubber, methallyl derivatives and octyl phenols; *n-Butenes* yield methyl ethyl ketone (via butan-2-ol) and maleic anhydride.

These methods show most promise for preparation of intermediates in the future: (i) oxidation, (ii) addition reactions, (iii) chlorination (and dehydrochlorination).

By their use it should be possible (a) to find more economical routes to existing intermediates and (b) to prepare new intermediates which will widen the existing range of plastics materials.

Oxidation. In many cases, raw materials are cheap and yields high but often difficulty is experienced in controlling the reactions which tend to be non-selective in the homogeneous gas phase (VP) giving rise to a mixture of products. Such methods are more successful in the USA where feed stock is cheaper. Liquid phase (LP) oxidation (*e.g.* butane to acetic acid) is likely to be the preferred route for the future, it being important to control the re-

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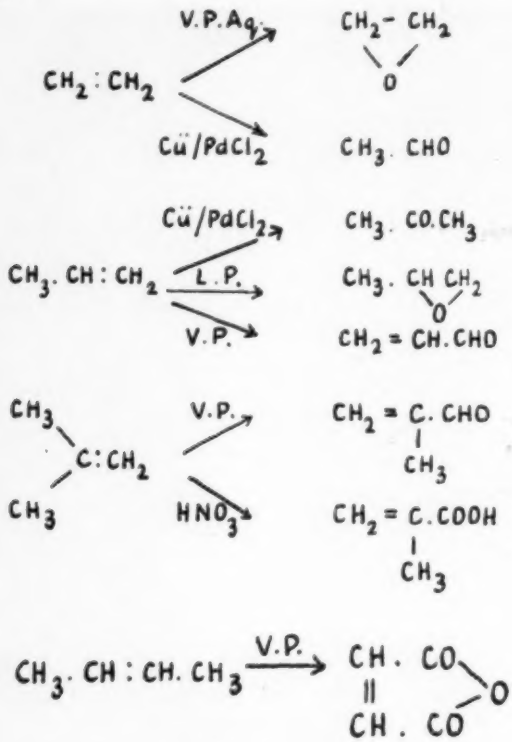
action so as to stop at any intermediate stage.

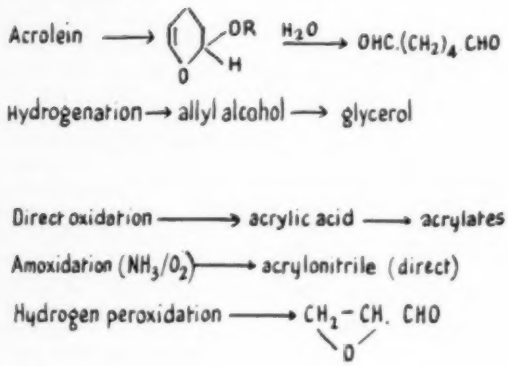
Some Interesting Examples

A. Olefins

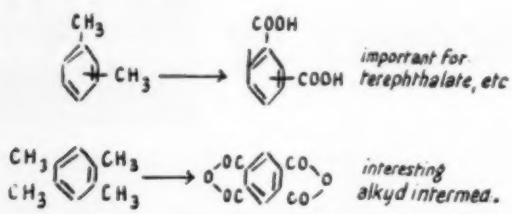


Of these, acrolein and methacrolein look the most promising intermediates for the future.

Some Reactions of Acrolein

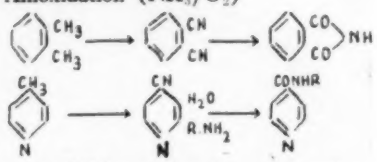


Oxidation of Aromatic Hydrocarbons



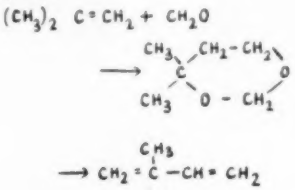
Phenol and acetone may be obtained by oxidation of isopropyl benzene; resorcinol and hydroquinone from m-diisopropyl benzene.

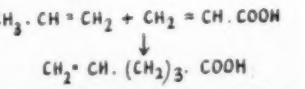
Amoxidation (NH_3/O_2)



In addition to the direct conversion of propylene to acrylonitrile.

Of great potential interest are certain olefin addition reactions which do not obey Markownikoff's rule and which yield bifunctional products. For example, the Prins reaction may be used to prepare 1,3-dienes such as *isoprene:*

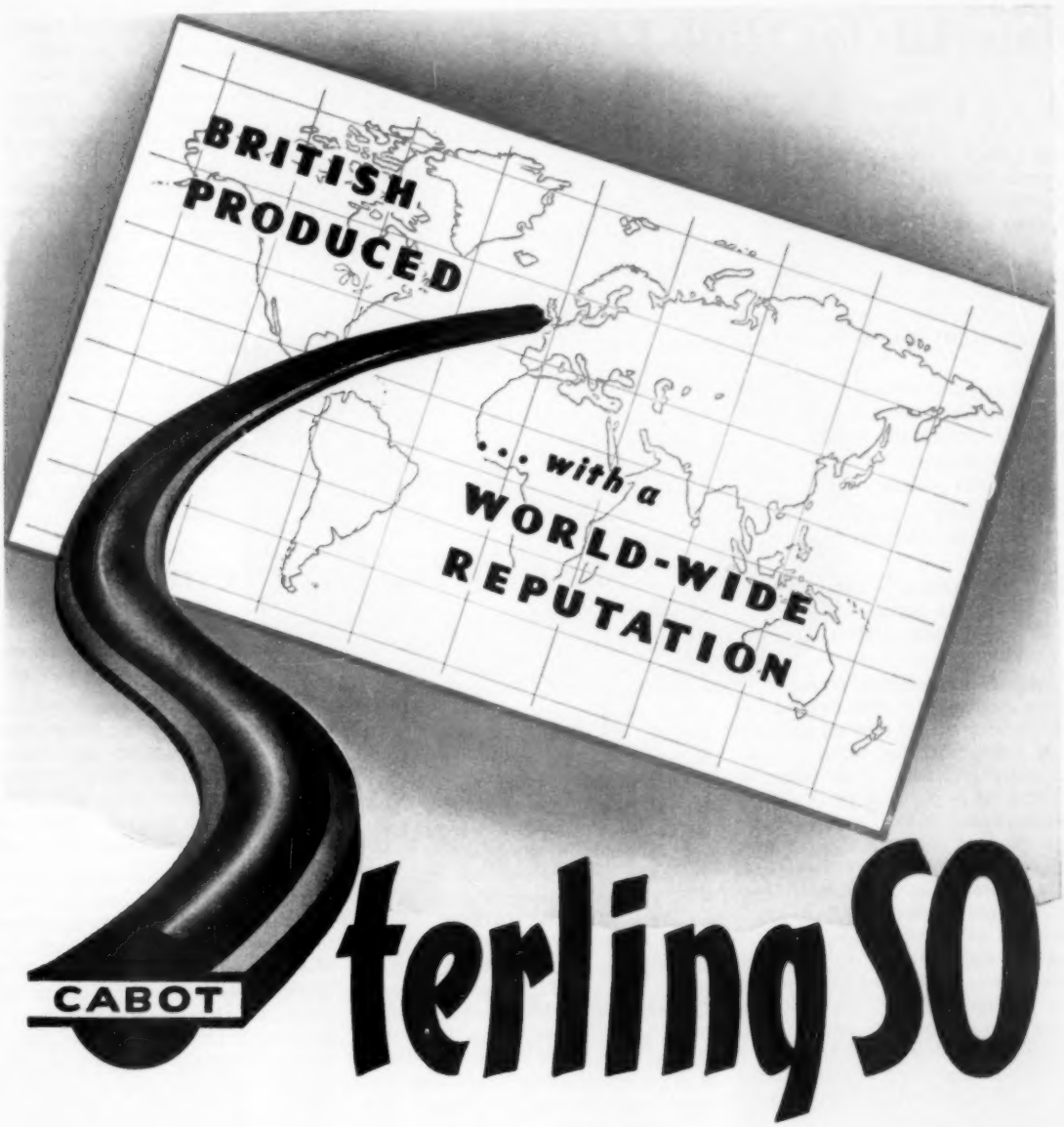




and the production of sebacic, 2-ethyl suberic and 2,5-diethyl adipic acids from butadiene.

Dr E. J. Boorman opened the discussion by presenting some interesting statistics concerning the growth of chemicals for the polymer industries over the period 1954-59. He asked whether there was any immediate likelihood of reducing the cost of some of the newer materials. Other pertinent questions concerned alternatives to molecular oxygen for oxidation reactions and the future of acetylene in synthetic processes. It seems that only hydrogen peroxide and peracetic acid are attractive economically and that acetylene is on the way out!

Concerning chlorination-dehydrochlorination, the author stated that this would be discussed fully in the written version of the paper. Its future depends on applying the HCl by-product or finding an economical method by which it may be oxidized back to chlorine. Other points concerned formaldehyde production, where the methanol route is likely to remain for some time since the direct oxidation of methane does not seem to have established itself as a production process. The possibility of producing Propane-1,3-diol by the Prins reaction was mentioned, also the dimerization of methanol and acetic acid by high energy radiation.



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Materials for High Temperature

DR N. J. L. MEGSON (Ministry of Aviation), delivering his paper called 'High Temperature Resistant Materials,' at the Polymeric Progress Conference, said that two separate problems existed in the aircraft field: to find materials for (a) high-speed aircraft ca. Mach 3, with continuous rating skin temperatures up to ca. 270°C., (b) rockets, where exposure is for much shorter times at higher temperatures.

Increasing the softening points of linear addition polymers has been achieved by three main methods:

(1) Introduction of substituent fluorine atoms

(2) Increasing crystallinity by preparation of stereo-regular polymers

(3) Cross-linking — although this does not necessarily improve the thermal *stability* of the polymer.

Condensation polymers prepared by linking ring systems often depend for their stability on the thermal strength of the links, ether and carbonyl linkages being preferred. Calculation of heat stability from bond energies often gives misleading results because of the large effect of substituent groupings. Assessment is preferably based on methods simulating the practical conditions of use, however, with the small quantities of development materials usually supplied for evaluation, measurement of mechanical properties is out of the question. Weight loss in air, vacuo, nitrogen, oxygen, etc., at various heating rates provides a suitable sorting test and this may conveniently be determined by means of the thermo-balance.

Dr Megson proceeded to discuss in a rather general way, some of the problems facing RAE and the aircraft companies. For applications such as 'Radomes,' where maintenance of electrical properties over a wide range of temperature is important, glass reinforced polyester and epoxy resins are not suitable above 150°C. Silicone resins improve on this temperature but no organic polymer has been found suitable for service at over 250°C. Ceramics are good with respect to electricals and rain erosion, but suffer from brittleness and implosion risk. In the field of rubbers, after mentioning silicones and 'Viton A,' attention was drawn to the interesting perfluoronitroso alkane / fluoroethylene copolymers developed by Haszeldine which contain a ~—N—O—C— ~ main chain.

In the field of semi-organic and inorganic polymers, the Russians appear to be making their materials containing Al—O— and Ti—O— main chain structures on an industrial scale. On the other hand our own $PNCl_2$ polymer is susceptible to hydrolysis and this defect is not fully overcome by the use of halogens other than chlorine.

Dr Redfarn opened the discussion by gainsaying this last information. He reported that $PNCl_2$—dihydric phenol condensates were going into production and he suggested that this had not been mentioned in the lecture because of the Ministry's security clamp! Professor Korschak pointed out that the C—C chemical bonds in graphite and diamond are stable up to at least 2,000°C. and that, far from abandoning organic polymers, this should provide a goal for polymer chemists working to improve the stability of the C—C backbone. Another questioner asked for information about the differences in thermal stability between a polymer and its cross-linked analogue (*e.g.* in the case of polystyrene). Dr Redfarn mentioned that in many cases it was possible to dissipate thermal energy in thermoplastics but not in their more rigidly held 'vulcanizates.' Dr Salomon referred to the influence of traces of dust on burning rate of polymers under 'flash' conditions.

(Further reports on papers from Polymeric Progress will appear in the next issue of RJIP.)

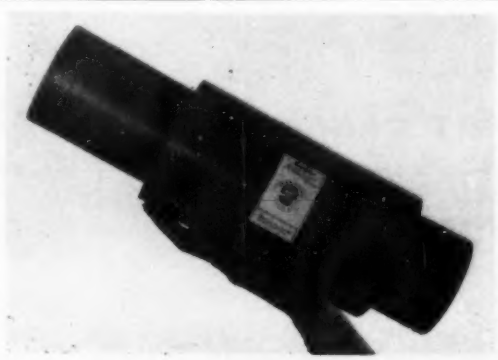
Synthetic Supplement

'The statistical position for rubber supplies in the years ahead indicates that natural rubber will have to be supplemented to a steadily increasing extent by synthetic elastomers,' said Dr W. C. Davey, of the Dunlop Research Centre, at the IRI Manchester section meeting on March 28. It was called 'The Future of Polymers,' and Dr Davey tabled the desirable properties in such elastomers and explained how natural rubber came near the ideal for general purpose use.

The SBR types had a number of good features, he said, but their shortcomings made it unlikely that their fields of use could be extended much further. The SBR latices had recently made progress and competition with natural was likely to turn on price. Polyisoprene rubbers had been prepared with *cis* contents close to that of natural rubber. Though the properties and performance had not quite matched up to natural's, these rubbers were the ones showing most promise as alternatives to it. Freely available butadiene made *cis* polybutadienes attractive, but their properties were such that their main applications were likely to be in blends with natural.

The polyolefin elastomers were unlikely to find general use, but probably some special purpose applications. The low resilience of butyl conferred certain features on tyres and efforts were now being made to obtain such features by compounding SBR types.

Regarding the many special purpose rubbers, the speaker went on, it was hoped that the attention given recently to improving the processing of some of them will be extended. The polyurethane rubbers were likely to continue as rather high cost special purpose rubbers for some time to come. The use of polypropylene glycols as base materials had improved polyurethane foams and further progress was anticipated. Finally, it looked as though the failing supplies of gutta percha and balata could be supplemented by either synthetic transpolyisoprene or transpolybutadiene.



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Problems of Staining

AS part of the series on compounding problems, at the National College of Rubber Technology, a lecture was given called 'Problems of staining and discoloration in coloured elastomer compounds,' by H. G. White of I.C.I. Ltd., Dyestuffs Division.

Discoloration is observed principally with accelerators and antioxidants, he said. In general, the slower the accelerator, the greater its tendency to discolour and this was demonstrated by showing a series of mixes in which both coloration and discoloration was observed with the slowest accelerators and discoloration up to and including the thiazoles and sulphenamides.

Amine type antioxidants produced severe discoloration and examples were shown using PBN and a ketone-amine. It was originally believed that high antioxidant efficiency was linked with discoloration but the advent of the phenyl alkanes in 1940 and, later, of the hindered phenols, had made possible the compounding of coloured rubbers for more exacting service conditions (ref: Williams, Proc. IRI 1956, *3*, 53).

The assessment of discoloration on exposure to sunlight had been facilitated by the advent of the xenon lamp, which showed an energy distribution curve similar to that of sunlight over a wide range of the spectrum. The tubes were costly and had a rather short life, but they were well worth while in terms of significance of the results obtained. Assessment of discoloration may be made crudely by the use of visual reference standards or by refined instruments such as the Du Pont 'Colormaster' which was sensitive to colour differences of half a trace (—the 'trace' is the least difference detectable by the eye of a trained colour matcher). A useful laboratory instrument, Mr White said, was the EEL reflectance spectrophotometer which measures % reflectance with respect to a primary standard (block of magnesium oxide) or suitable secondary standard (glazed tile). 'Hue' may be measured by carrying out reflectance measurements over the whole of the visible spectrum. In evaluating the discoloration produced by 'non-stain' antioxidants, it had been found that the greatest reflectance differences between sample and control were obtained using the Ilford 601 (violet) filter and a quantitative index of discoloration may be calculated from the change in reflectance of this wavelength band.

Staining

No precise test existed for migration staining since it was difficult to reproduce to order. The ASTM method was described and said to be less than satisfactory on account of bleaching troubles. The Dyers and Colourists Grey scale could be used; this compared degrees of contrast by reference to standards. Heat treatments, *e.g.* five days at 70°C.—followed by exposure of the contact area to light, formed the basis of the majority of test methods.

In discussing various practical problems, the lecturer referred to interaction between dithiocarbamates in rubber and the stabilizers in PVC. In covering latex foam with PVC leather cloth, it was better to evaluate the system by making up trial 'cushions' than by painting solutions of the rubber chemicals in solvent on to the PVC surface, since this procedure could give misleading results.

Colours: Pigmentation

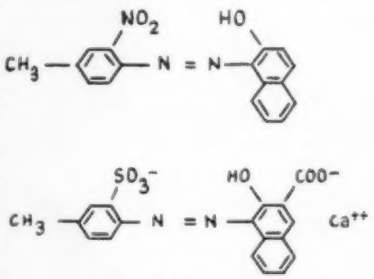
The coloration of rubbers was full of pitfalls, commented Mr White, and he exhibited some of the deeper pits which had come his way recently, including a buff record turntable with yellow spots, a black leatherette with a cloudy yellow surface and an anaemic dipped glove which should have been rose pink. Avoidance of this type of defect required some understanding of colour chemistry.

Inorganic colours were generally 'weak' and 'flat' but insoluble and permanent under a wide range of conditions. Some chemical instability problems may arise such as the reaction of pigment impurities with sulphur leading to darkening or the use of lead chromate as a yellow pigment in floor tiles which was destroyed by alkali from the cement or from scouring agents. Iron oxide gave stable dull reds and browns but may react with chlorinated paraffin wax used as an extender in PVC compositions, giving a 'measled' appearance due to the formation of $FeCl_3$. Again troubles were observed with iron in the presence of tritolyl phosphate.

Organic colours were often more stable to chemical attack, Mr White added. There were two principal groups:

1. Lakes—consisting of (water-) soluble colours precipitated or adsorbed on the surface of an insoluble salt such as barium sulphate and
2. Pigments—which are wholly organic.

The first group were often poor in light fastness and water sensitive; the latter may lack heat stability. Demonstrations were given of 'bleeding' of colour during open steam cure and from solvents and plasticizers and reference was made to the possible staining of cotton and synthetic textiles in sheets by damp hot-water bottles. The chemical structure of five red colouring matters were presented: Red 3, Red 2, Red 41, Red 57 (colour index refs.) and a new material 'polycyclic red.'



Red 3 (*top*) **and Red 57** (**Lake**)

These were compared in NR, NBR, PVC, Hypalon and polythene using different moulding temperatures and times and subjecting the products to a heat stability test (10min. at 200°C.). Where bleeding was not a serious service problem, the calcium lake (Red 57) had been shown to give good stability in Hypalon and PE although the standard test for the latter was usually operated at 280°C. when rather different results may be obtained. Red 3 changed colour even during cure and so was only suitable for tint shades but polycyclic red showed a rare combination of heat stability with absence of bleeding.

The explanation of the differences between pigments in respect of contact bleeding was given as follows: a pigment present in small concentration but with high solubility dissolved completely during mixing but may remain as a super-saturated solution when the polymer cools. On the other hand, a higher concentration of pigment of lower solubility left some undissolved at mixing temperatures and this would nucleate the remainder so preventing super-saturation. As a result, many pigments which gave little trouble at normal loadings may give rise to difficulties when present

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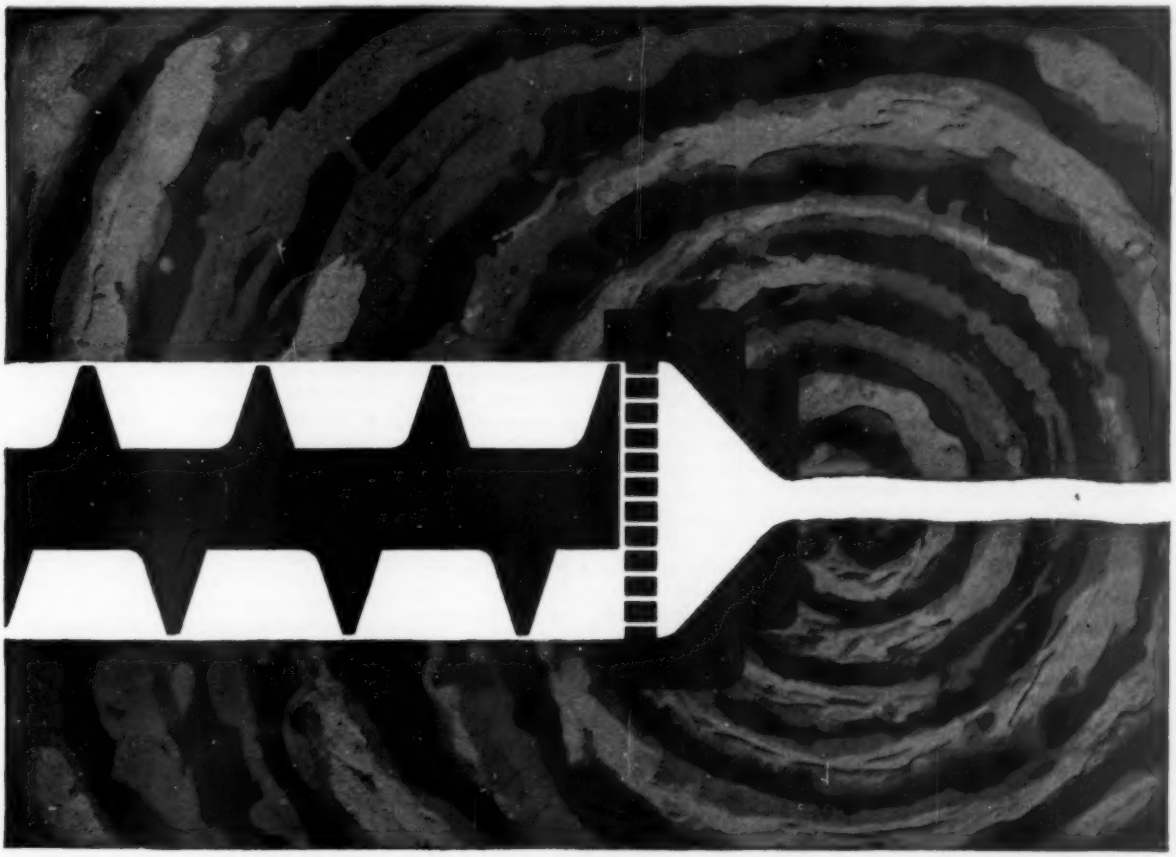

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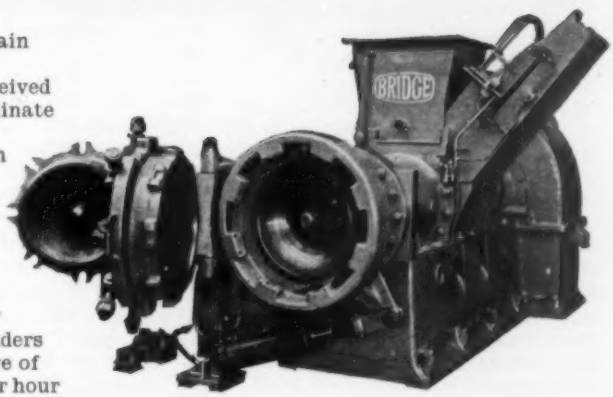

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Where Plastics are Going

CHAIRMAN'S ADDRESS TO PI LONDON SECTION

IT would probably have been safe to wager that most of the large audience present at the Chairman's Address given by Dr Gadsby to the London Section of the Plastics Institute had not anticipated the sort of lecture they heard.

In the nature of things, most lectures on plastics deal with matters of the moment, but for this one Dr Gadsby took for his canvas the broad sweep of human history. From neolithic man's battle with nature to our present industrial activities the speaker tried to elaborate some generalizations which characterize the growth of man's mastery over materials and from them to make some forecasts as to future trends and needs in the plastics industry.

The chairman classified materials in three groups, stones, metals and natural products; the last coming from things once living. Natural products are high polymers in the main and are closely related to synthetic high polymers which form the basis of the plastics industry. For this reason polymers, natural and synthetic, would be considered as one group.

Earliest man first turned his attention to the stones and natural products, using the former, which he had fashioned to primitive tools for working wood, skins and bones. This was the most primitive technology; cutting, chipping, scraping and throwing away. Later, with the advent of fire came the discovery of metals and glasses. Both were shaped, the metals by casting and forging and the glasses, or the stones, by the techniques evolved for ceramics. Alongside these historical developments there came the working methods, which might be termed 'geometrical rearrangement' as exemplified by the emergence of textiles and boatbuilding from planks of wood as distinct from hollowing out the trunk of a tree.

Leaping over the intervening millenia, Dr Gadsby noted that the industrial revolution did not basically alter this pattern of technology. Its main impact was through the application of power. A new feature did arise however with the exploitation of rubber and gutta percha, *i.e.* the shaping of natural products. This group of materials had so far been amenable only to cutting, chipping and rearranging but unlike the stones and metals could not be shaped. This group, consisting of high polymers, as previously defined, includes the plastics materials and in the view of the speaker the consequences of the development of shapeable high polymers will play a larger part in the industrial processes of the future than they do today.

Two limitations must be overcome if the full potential of the plastics industry is to be realized. First the lack of stiffness of the materials and second the economics. The reduction in the capital cost of synthetics would help enormously in their fuller exploitation.

Thinking along these broad lines Dr Gadsby arrived at a number of conclusions bearing on some current problems. He could see no fundamental distinction between the rubber and plastics industries. They each comprise part of the single industry concerned with the shaping of high polymers, natural or synthetic. Their respective technologies and also their Institutes will inevitably draw more closely together.

Three Fields

The high polymer industry presents three fields of study: polymerization, the physical properties of polymers and flow, which is the basis of the transformation to the finished article. All three meet in the study of the molecular structure of polymers. But while the chemical aspects of the business are being actively studied in British University, there is a dearth of physicists investigating problems posed by the properties and flow of high polymers.

Where are plastics going? In addition to those applications which they themselves have created, they will, in the near future, replace metals and ceramics in some applications where their special properties are not essential. Over a longer period there will be a new distribution of applications between high polymers which are shapeable and those which are not, with a bigger share for the former.

BPF's First

The first annual dinner of the British Plastics Federation is to be held on Wednesday April 27, at 7 for 7.30 p.m. at the Dorchester Hotel. The guest speaker will be Sir William Rushton Black, J.P., chairman of the National Research Development Corporation.

PROBLEMS OF STAINING

Continued from Page 578

in trace concentrations as shade 'brighteners' or even accidentally as contaminants.

To conclude a most interesting lecture, Mr White compared and contrasted the behaviour of various pigments in the range of polymers mentioned previously and it is to be hoped that he will publish the details of this work, preferably illustrated by colour prints.

Among points raised in the discussion were problems of coloration, discoloration, and bloom with current antiozonants; suitable pigments for silicone rubbers which are principally inorganic in nature although Monastral Green can be used (but not the phthalocyanine blue); the effect of concentration of antioxidant in the rubber on the resultant discoloration in which the lecturer stated that small concentrations may give as much or more trouble than larger loadings; the relatives rates of migration from uncured and cured rubbers when the answer seemed to be that undercured rubbers showed greater migration troubles; and the nature of 'rubbing fastness' which may be impaired by the inclusion of wax in the compound since this may bloom and in doing so carry quite insoluble materials to the surface of the rubber.—D. A. S.

Mr P. Weston-Webb has been appointed managing director of Chemstrand in succession to Mr A. L. Davies who is returning to the US to assume duties there with the Chemstrand Corporation.

Scotch through plastics pourers by United Glass (Thermoplastics) Ltd., using British Resin's Product's polystyrene. They are ingeniously moulded with a combined pouring channel and air intake

VIEWS and REVIEWS

COMMENT ON SCIENTIFIC AND INDUSTRIAL MATTERS

by **Dr Schidrowitz**

Reviews for 1959

THESE notes are based on articles printed in No. 5 of *Rubber Chemistry and Technology* and published by the Division of Rubber Chemistry of the American Chemical Society. It constitutes *No. 5 of RC and T* and is an annual publication instituted last year. Broadly, it is not critical—that is to say, not in a hostile scientific sense — but is an innovation which will be welcomed, and is, therefore, not comparable, for example, with Stead's *Review of Reviews*, which, it may be stated, was pure journalism, and, of course, critical. Each type will have its adherents, and could not well be compared—if I do so, it is for want of a better yardstick, and in no way derogatory, as might be gathered from the use of the term 'journalism.'

Tensile Strength

The first on the list is 'The Tensile Strength of Elastomers According to Current Theories,' and is by F. Bueche, of the Department of Physics, University of Wyoming, Laramie, It is a treatise covering, including the *Summary* and *References*, 17 pages.

Introduction

It is not my object, in general, to set out the purpose of papers, but this is so clearly put in the present one that I cannot refrain:

'Perhaps,' says the author, 'no property of rubbers has been more widely measured than has tensile strength. Its practical importance is obviously great. Consequently, a large amount of research effort has been directed towards the development of high strength in rubbers. This fact notwithstanding, it still remains true, that the molecular mechanisms observed for the strengths of rubbers are, for the most part, only vaguely understood. . . .'

Summary

It is remarkable that the author sets out the summary of his findings in about ten lines. Here they are:

'In summary, it is probably true to say that the basic mechanisms for the tensile strength of rubbers are now mostly known. Some disagreement exists concerning the exact role played by crystallinity and filler action. Opinions concerning the way in which the fracture propagates through the filler also differ. It is clear that all the present theories concerning tensile strength are inadequate in many ways. Although the basic ideas involved may be quite correct, much refinement in these theories is still needed. They are only rather crude first approximations to a fully successful theory of tensile strength. It is hoped that this review has been successful in pointing out the successes and failures of current theories so that improvements may be made in them.'

Reinforcing Silicas and Silicates

The next on our list is the truly monumental 'Fine Particle Reinforcing Silicas and Silicates in Elastomers,' the 100-page treatise by John H. Bachmann, John W. Sellers, Melvyn P. Wagner, and Ralph F. Wolf (all of The Research Laboratories, Columbia-Southern Chemical Corporation, Barberton, O.), although the last-named is now with the Natural Rubber Bureau in New York.

It cannot be expected that the chronicler shall fill in all the detail which more than fills two pages of the 'Contents' table. There are IX main sub-divisions with many sub-divisions, the main divisions being:

Introduction; Types of Silica and Silicates; Manufacturing Methods; Properties of fine particle-sized Silicas and Silicates; Reinforcement; Coated Silicas; Compounding and Application of Reinforcing Silica and Silica Fillers; Acknowledgments, and References.

The sub-divisions may be illustrated by *IV-C* which reads 'Physical Properties of Commercial Products':

1. Tables. 2, Surface area; 3. Particle diameter; 4. Comparison of surface area and particle diameter; 5. Bulk density and specific gravity; 6. Oil absorption; 7. Refractory index. These answer some *75* queries.

Introduction

As the term *Reinforcement* has been used in the title it is desirable that it should be defined—it is that offered by Studebaker, and is: 'Reinforcement has been described as "the enhancement of one or more properties of an elastomer by the incorporation of some ingredient thus making it more suitable for a given application." Of this the authors say: This definition gives an excellent qualitative description of the reinforcement of an elastomer, but lacks the quantitative aspects necessary to describe specifications for materials to be included in the present review on reinforcing siliceous fillers.' . . . 'The scope of the present review will therefore be defined in terms of the properties of the siliceous fillers rather than in terms of the degree of enhancement of one or many elastomer properties,' and moreover, 'Experience has shown that substantial improvement in the physical properties of vulcanizates generally cannot be expected from siliceous fillers greater than 50 milimicrons in number average particle size, or less than 50 square meters per gram in specific surface areas. These specifications will be used to delineate the silicas and silicates included in the present review, a general outline of which is presented in the following paragraphs. . . .' I have no space for the 'outline' but think that it may be regarded, possibly, from the point of view of, shall we say, 'contracting out.'

Note

Another technical information sheet from Esso Petroleum, in addition to the ones previously quoted (*RJIP*, April 9) is the following:

Technical Information Sheet No. 17 — Tackifier System for Butyl Compounds

Recent laboratory data has shown that a synergistic effect is obtained by the use of combinations of Amerol ST 137X and Pentalyn K. The use of this eutectic mixture results in tack levels comparable to those of natural rubber.

PHILIP SCHIDROWITZ

MEN and MATTERS

A Review of People and Events

by George A. Greenwood

IT was announced the other day that Mr Gerard Riddick had been appointed chairman of Formica. It is a pleasure to be able to add something more to the bare official statement about the man who now becomes head of the United Kingdom subsidiary of Formica International, succeeding Mr A. G. Norman.

Mr Riddick is both a dynamic and a charming personality, who, at 39, has become a quite prominent figure in the British plastics industry. He was born in 1921 at Moberley, in Cheshire, and was educated at Stowe School and at Clare College, Cambridge. As a young man he served during the second World War in the Rifle Brigade, and lost a leg fighting in North Africa, but by 1945 he was with the De La Rue Company, on the security printing side, and went out to run that organization's factory in Bombay for 18 months in the years 1947-8. Then he went to Karachi at the end of the latter year, and spent three years there, forming and running the Pakistan Security Printing Corporation Ltd.

In 1951, he became more closely connected with his present interests through his transference to the Plastics Division (now Formica Ltd.), of De La Rue. He became Delaron sales manager in 1952, general sales manager in 1953 and general manager of the plastics division in 1954. Two years later—in July 1956—he joined the Board of Directors of De La Rue, and on its formation on September 16 1957 Mr Riddick was elected managing director of Formica Ltd.

Important Changes

There have been important changes, even since then. This company, which acquired all the plastics business of De La Rue and the ownership of the Formica Trade Mark in the Eastern Hemisphere, is owned 60% by De La Rue and 40% by American Cyanamid. It now has subsidiary companies in the UK, France, Australia, Germany and New Zealand and licences in Italy and Spain.

On April 2 last, Formica Ltd. changed its name to Formica International Ltd., and the name Formica Ltd. was adopted by the United Kingdom subsidiary. From that time and until April 6 last, Mr Riddick has been managing director of Formica International Ltd. and of Formica Ltd.

Now that he has become chairman of Formica Ltd., Mr Riddick has relinquished his post as the company's managing director, in which post he is succeeded by Mr D. A. Moore, but he continues to be managing director of Formica International Ltd.

I might add just one word about Mr Arthur Gordon Norman, D.F.C., whom Mr Riddick succeeds as chairman. Mr Norman joined the undertaking at the end of 1934. He became a director in May 1951, and managing director in 1953, after which he was appointed to the chair. Mr Moore, by the way, the new managing director of Formica, will continue as works manager of the company's factory at Tynemouth until June 1.

Forcing Tulips

The forcing of tulips and other plants during the winter months by covering with an opaque material is not a new idea but, as all gardeners will know, it is difficult to find a satisfactory material for covering the bulbs. Bakelite now tell me that tulips can be successfully and simply forced under black polythene film during winter. The technique, which can be used by anyone with a heated greenhouse, was worked out by Zwetsloot and Sons Ltd., Sandy, Bedfordshire, using black film based on Bakelite polythene.

Some of the advantages are, I believe, that it is completely opaque; where the film is overlapped, it remains flat and in contact with itself so that no light can permeate through the joint; and the light-weight film doesn't crush the bulb.

Special Products Man

Shell Chemical Company's Plastics Division have announced the appointment of Mr A. Glyn Owen to their Special Products and Marketing Services Department, as sales manager for 'Styrocell' Expanded Polystyrene. In this role he will also be responsible for developing new markets and applications.

Mr Owen, an associate of the Institute of Refrigeration is already well known in the thermal insulation field. He took an honours degree at Dublin University in 1952 and among other activities he is a part-time lecturer at the National College of Heat-

Novadel Ltd. at a lighter moment during their technical sales conference held recently. Several films were shown at the conference on the production and application of plastics

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North British Director

The North British Rubber Company, Edinburgh and Dumfries, has announced the appointment of Mr Edward J. Higgins to the Board of Directors. Mr Higgins succeeds Mr Ludwig C. Boos, who died suddenly in December last.

Mr Higgins, who is now General Manager of the International Division of United States Rubber Co., has a long association with the rubber industry in America. He was a development engineer with the Fisk Rubber Corporation when the assets of that company were acquired by US Rubber in 1939. He was transferred to the International Division as technical service manager in 1944 when the company was embarking on expansion of its overseas manufacturing facilities, and during this expansion served successively as development manager, director of manufacturing and development, director of staff operations and assistant to the general manager.

This Matter of Noise

Not so long ago I was writing about the activities of the Anti-Noise League into which the chairman, Sir Walter Fergusson Hannay, has roped me. It is pleasant to be able to say that this organization, which must be very close to the instincts and desires of most of us, is growing enormously, but especially to be able to add that in the world of industry and transport the services of PVC, in the form of the Marley Acoustic Pyramid, is playing an important part as an absorber.

My friends of the Marley Group have sent me some fascinating information about how the application has been proved in the fitting out of the MV *Thameswood*, a vessel of the Constantine Line, where, before this enterprise, noise in the engine room made communication, even by shouting, practically impossible. Apparently, conditions in the 'accommodation,' were almost equally uncomfortable as a result of the noise transmitted which penetrated even to the bridge.

So what happened was that to deal with it all, 300 Marley Acoustic Pyramids were installed, and measured results showed a four-fold reduction in the overall noise level. Sound level decreased by six decibels. These pyramids are made of perforated vinyl, 8½in. deep and with a base of 22in. square, filled with mineral wool.

Sir John Hay

Sir John Hay, whom Mr Alexander Thomson, of *The Evening Standard*, calls 'the grand master of Malayan rubber,' is just back from a three months' visit to the plantations which his various companies own, and full of enthusiasm about present conditions and prospects for the future. But what interests me equally, if not still more, is that he is just as full of good health and spirits, so friends tell me. After all, Sir John, like all of us, is not so young as he once was—he was born in 1888 and was president of the Association of British Malaya so long ago as 1936-37, but apparently age was no deterrent to his journeyings, to see for himself what exactly conditions are like.

'Rubber growers,' he says, 'are working flat out producing all they can. That shows natural rubber has unique properties which synthetic cannot match.' He says, too, that replanting will raise Malaya's annual output of 'natural' from 700,000 tons to 90,000 tons in the next five years.

Still Expanding

There is news of further expansion by I.C.I., and in one respect at least it is of interest and importance to rubber and plastics. This is the big additions which are to be made to the methanol plant at the Heysham works, in Lancashire. Apparently the continuing advance in the making of plastics has resulted in this need for greater capacity at Heysham, and the new plant there making 30,000 tons a year has now been in production for a few months. The extension now planned will make an additional 45,000 tons a year, but this is going to be a big job, and the work is not expected to be completed for a couple of years.

I.C.I.'s other new enterprise is to be an ammonia plant with a capacity of 100,000 tons a year, and associated plants, to make urea and fertilizers, will go up at the Severnside Works in South Gloucestershire. This is going to cost nearly £10,000,000. It will be remembered that in February I.C.I. announced that they were to construct at Severnside plants to make ethylene oxide and ethylene glycol, costing £5,000,000.

H. T. Smith, export sales manager of Dunlop's general rubber goods division, has recently retired after 39 years service with the company

Bakelite Records

There is, in a way, a tie-up with all this in the remarkable figures just published by the Bakelite group, showing not merely record sales and profits but a really astonishing expansion in operations. The profit has gone up from £538,458 to £1,250,554, which certainly suggests an equally impressive rise in turnover, but it is to be noted also that Mr Stanley Adams, the far-seeing chairman, and his colleagues on the board, are raising the dividend by only 2½% to 17½%.

Mr Adams has very wisely and properly given his own summary and analysis of the present position in a statement issued with the accounts to precede the company's annual meeting at the end of the month. He says that the heavy demands for the established products were maintained and that there has been a marked increase in the sales of their newer thermoplastics materials. In the polythene field, too, the position was further improved, but probably, from the point of view of general interest, the most important item in Mr Adams' review was the announcement that the company has completed some big orders received, as I think I stated at the time, from Soviet Russia.

Dr S. F. Birch

Many people who know the important contribution which Dr S. F. Birch made to the science and industry of petro-chemicals, and in a way to their application to rubber and plastics, will be sorry to hear of his death which occurred last week after a brief illness. He was 61. Dr Birch went from Hurstpierpoint College and St. Paul's to the Imperial College of Science, and continued post-graduate research training under the late Sir Jocelyn Thorpe, F.R.S.

He joined British Petroleum in 1923, when it was the Anglo-Persian Oil Company and remained associated with it throughout his life. He was fundamentally a research man, but he was always keenly alive, as his friends know, to the application of his discoveries, and he had a world reputation for his work.

Africans Master the Job

NEWS FROM SOUTH AFRICA

AFTER a full year's production experience at its £2,000,000 Bulawayo factory, the Dunlop organization has found that African labour measures up to the same standard of skill and reliability as that of workers in the organization's other factories. The 350 Africans employed on production are doing exactly the same jobs as Europeans—and other races—in Dunlop factories throughout the world. More than 60 have been promoted to leading hands in charge of different phases of tyre and tube production. European foremen are in over-all charge, to ensure that the rigid standards are adhered to.

The works director, who came from Britain to put the factory into production, said: 'The quality of workmanship among Africans is definitely better than we expected to find. We had been told that Africans would be good at repetitive assembly line work, but not reliable on jobs requiring frequent variation. In fact, we have found that even in the most skilled jobs the Africans are capable of matching European standards. With the giant tyres, for example, where a high degree of skill is required, not only are they able to turn out first-class work but they can switch to other sizes requiring different techniques with no loss of skill or concentration.'

A team of skilled instructors was sent to Rhodesia from Britain to train staff—both European and African—but in some operations they were able to report that the Africans had thoroughly mastered the techniques in less than the average training period in Britain. The factory takes particular care in choosing its African staff and there is a fairly high entrance examination. The leading hands are paid £5 5s. a week, plus rent, but the factory is working on the theory that African wages generally in industry will double in the next few years.

Shoe Battle

South African indent agents—with large orders for Japanese plastic shoes on the way to the Union by sea—are faced with substantial losses as a result of imposition of higher customs tariffs on shoes imported from Japan. This most recent duty to be placed on Japanese goods has been welcomed by South African shoe manufacturers who say it will protect them from unfair competition—particularly in the infants' and children's ranges. Others contend, however, that it will be a severe blow to the consumer which will result in yet another rise in the cost of living. The new duty is expected to prevent the local market from being flooded with size three to size six infants shoes. In these ranges, Japanese plastic footwear, retailing at between /s. 11d. and 9s. 11d. a pair, had made severe inroads into the South African market, where local leather products retail from 13s. 11d. upwards. In future a duty of 4s. a pair will be charged on all shoes of this type entering the country from Japan.

Local manufacturers said that, because of the difference in the standard of living structure between South Africa and Japan—and the cheap labour available in the East—they could not compete without tariff assistance. 'Any duty which protects us from this type of competition is appreciated in the footwear industry.' Even manufacturers of footwear in price categories in which there was no Japanese competition, agreed with this view. But indent agents who had placed large orders in Japan, regard the new duty as grossly unfair and as they were given no notice of the imposition they stand to lose heavily.

Revolutionary Leg

Mrs. Joan Tribelhorn, of Oudtshoorn, Cape Province, South Africa, whose leg was amputated 15 years ago and who now uses what is claimed to be a revolutionary plastic artificial leg developed at Cape Town University, says she has learnt to walk normally. Even her friends are claimed to be unable to detect her artificial limb without a close examination. She is the person Cape Town doctors used to test the invention made last year by Prof. C. E. L. Allen, head of the university's orthopaedics department.

After the first model was produced, she had to travel 300 miles from her home town to Cape Town, whenever tests were necessary. She says she now has a perfectly smooth forward stride which is absolutely natural; so much so, that she can almost imagine her own leg there.

Further experiments are still being carried out on the artificial limb, which has excited widespread interest throughout the world. Soon a selected group of patients will test the first manufactured models.

TUFNOL IN THE MAKING

The manufacturing processes that go into the making of Tufnol—from the receipt of raw materials to the finished product—are shown in a first-class film, 'Tufnol in the Making,' made by the company at their Perry Barr, Birmingham, factory.

The film, 16mm. in full colour, was originally planned for showing to customers unable to spare the time to visit the works, and also for new employees. The effective and imaginative treatment of the subject must, however, make the film appeal to all who are interested in laminated plastics.

Captured in 24½ minutes running time — although such is the film's fascination that it appears to take far less—is the whole process, starting with the paper, cotton and phenolic raw materials and following through the impregnation, drying, pressing and finishing processes.

The manufacture of sheet, rod and tube in impressive variety is clearly illustrated. The sheet, for instance, receives its spectacular gloss from the highly polished steel plates between which the impregnated paper is stacked in pre-cut squares to the required thickness before being cured by heat and pressure, in some cases for up to nine hours. Tube is made with the use of a mandrel and rod without one. Notable, too, is the emphasis laid on the stage by stage inspection by which the high quality of the company's products is maintained.

Altogether a very fine film that whets the appetite for a sequel covering the manifold uses of Tufnol.

J. H. Jarman

The sudden death is announced of Mr J. H. Jarman, Chief Engineer (Sales) of Tufnol Ltd., Perry Barr, Birmingham.

He joined George Ellison Ltd. in 1913 and, from their drawing offices was transferred to Tufnol, later to be appointed Chief Engineer (Sales). An authority on laminated plastics bearings, Mr Jarman presented numerous papers to engineering societies and occasionally contributed articles to the engineering Press. He represented the British Plastics Federation on committees of the British Standards Institution and also served on the committee of the Midlands section of the Plastics Institute.

Mr Jarman, who was 63, leaves a widow and one son.

Hungarian Testing Machines

A CENTRAL organization which makes material testing apparatus has been in existence in Hungary for some time. One section produces testing instruments for the plastics industry, and details of some strength testing apparatus are given below:

Tensile Testing Machines

S.F.1: 2,500kg. (50cwt.) tensile testing machine

This completely enclosed press-button-controlled machine is primarily intended for testing stronger plastics. The lower box-like part accommodates the dynamometer pendulums and the variable gearbox of the transmission. The clamping heads with wedge-clamped special jaws are arranged between two columns. The dynamometer gives direct readings and stress-strain diagrams can be recorded.

The specially geared bracket system allows the machine to be used for both tensile and compression tests.

SzKG2: horizontal tensile testing machine

The machine is mainly suitable for testing plastic boards and foils. The clamp heads travel along rollers and vee guides on the cast iron table. The sample is chucked between the screw-clamped clamps. The clamp heads are exchangeable to suit the material under test. The force is measured by a pendulum, arranged next to which is the circular-scale dynamometer and the diagram drum.

Sz500-2 and Sz500-3: vertical completely enclosed tensile testing machine

The infinitely variable transmission gear and the motor are arranged within the casing. There is a separate motor for the fast load-free motion of the clamping head. The two clamping heads are located outside. For hard plastic materials wedge-clamped, for plastic foils screw-clamped clamping heads can be supplied. The values of stress and elongation can be read from two circular scales. The machine can also trace stress-strain diagrams. This machine is produced with two measuring ranges: Type Sz500-2 from 8—50kg. and 20—200kg., type Sz500-3 from 20—200kg. and 50—500kg.

Hardness Testing Machines

The usual method of testing the hardness of a material is to press a body of a given size and shape with a given force for a given time into the sample and measure the depth of indentation. The harder the material, the shallower is the depth of indentation.

MKV1: hardness testing machine

The various loads are applied by simply turning a knob which actuates the weights arranged on the measuring arm. The speed of loading can be regulated by the oil brake located under the weights. The depth of indentation is read off on a dial indicator. The indenter is a steel ball of 5mm. diameter. The support holding the sample can be moved in a vertical direction and forced against the indenter by an elevating spindle.

MH1: bending tester

The sample is placed on two supporting edges fitted on the lower motor-actuated bending table. By elevating the table the sample is pressed against a pressing edge fixed on the upper measuring equipment. The stress is measured by a pendulum scale system.

MHM1: fatigue tester

The purpose of this machine is to detect the grade of susceptibility to cracks and ruptures by quick-bending of pliable plastics. The De Mattia system instrument is suitable for the simultaneous testing of ten specimens and is fitted with a stroke counter. Facing the fixed clamping heads are the moving clamping heads, whose back and forth motion is powered by an electromotor-driven eccentric pin fixed on the spindle shaft.

MD1: Dynstat machine

In case of very small specimens, for instance finished plastics goods, the Dynstat machine is used for testing the static and dynamic flexural strength. The dimensions of the specimens are 15 by 10mm., thickness up to 4mm.

Mr J. G. Smith, Mr J. H. Givens and Mr M. R. Parker have been appointed directors of British Celanese.

Klanang Produce Co. Ltd. is winding-up and liquidators have been appointed.

Question Corner—113

(Second Series)

438. For what reactions are isocyanates used?

(Answer next week)

Answer to Question Corner—112

437. For the production of sheeting to be used in the manufacture of safety glass the polyvinyl butyral is compounded with plasticizer and with enough solvent (such as acetone) to form a plastic mass. Sheets are then formed by extrusion through a slit die, followed by removal of the solvent by brine seasoning. The sheets are then dusted with talc, or sodium bicarbonate, and rolled up for storage.

Among the plasticizers that have been suggested are dibutyl sebacate, diethylene glycol, and esters of di- or triethylene glycol with caprylic, lauric or other long-chain acids. For laminating, the sheets are washed and dried and then placed between two specially cleaned and treated glass plates and subjected to heat and pressure. The lamination may be completed in an autoclave at a higher pressure and temperature. Polyvinyl butyrate laminates require no edge sealing.

Polyvinyl butyral has found extensive application for this purpose because of its excellent stability and adhesion. Properly plasticized butyral resin will adhere well to broken glass and not allow it to shatter. References: USP 1,956,564; 2,083,557; 2,327,627; 2,325,177; 2,340,482; 2,274,672; 2,279,145; 2,396,209.

(Another question next week)

Polly Ester Says . . .

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Sales Planning and Control

AMONG the chief speakers at the recent One-day Management Conference held in Belfast under the auspices of the National Union of Manufacturers was Mr J. P. Stephenson, general sales manager, Footwear and Consumer Products Division of The North British Rubber Company. His talk was entitled 'Planning and Control of Sales Activities.'

Mr Stephenson outlined the main areas of a company's activity that normally come under the control of the sales manager. Broadly, these were the discount and the sales sections. He made as his main point that the financial data available to company management should initially be of such a nature as to allow for a regular flow of information on how actual spending was proceeding against budgeted estimates, so that a judgment position could be taken on each of the many sections.

He developed the theme to show how each of these sections was in itself capable of the widest interpretation and could substantially affect the profitability of a company. Dealing with control of a sales force, Mr Stephenson outlined the statistics and reports necessary for sales management to take an active part not only in checking on failure but on actively planning success.

However, beyond the importance of organization, he stressed that more important than in any other section of a company was the influence of people. Both organization and people were necessary. Possession of the people could easily create, with advice and direction, a good organization. Possession of a rigid organization could not of itself produce the people.

To have at one's disposal the information as to exactly where money was being spent did not necessarily ensure that the resultant judgment would in any way be the correct one. Generally speaking, he felt that the smaller companies tended to underrate the qualities necessary in their salesmen, and the complexities inherent in a selling organization where consumer goods of any diversity were concerned.

Price-fixing Judgment

The price-fixing agreement among members of the Phenol Producers' Association was declared to be contrary to public interest at the Restrictive Practices Court in London on April 8.

Delivering judgment, Mr Justice Pearson said that the rigidity of the fixed price and its ancillary terms and conditions was a disadvantage to purchasers.

Mr D. A. Grant, for the association, gave an undertaking not to enforce the agreement, or to enter into any new agreement, without informing the Registrar of Restrictive Trading Agreements.

BERLIN CONFERENCE

Synthetic rubber and synthetic fibre for the rubber industry will be discussed in many contexts at the International Rubber Conference to be held this year from October 4 to 7 at the Berlin Congress Hall (*RJIP* November 14 1959). Experts from 30 nations will join in a worldwide exchange of experiences covering scientific developments most recently achieved.

The subjects to be dealt with at this meeting will include problems of topical interest covering the chemical, physical and technological aspects of synthetic rubber and synthetic fibre developments for application in the rubber industry as well as testing methods. The organization of the Conference is in the hands of Deutsche Kautshuk-Gesellschaft, a scientific association of chemists, physicists and engineers concerned mainly with the promotion of rubber research.

The Conference will be coupled with an exhibition of rubber processing and testing machines in which manufacturers from several countries will participate.

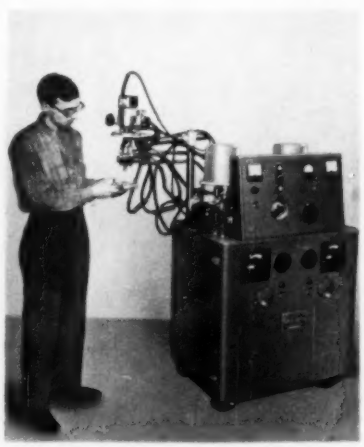
IRIGS

The spring weekend of the IRI Golfing Society was held at Highwoods Golf Club, Bexhill, on March 26-27. Although many members were unable to attend owing to illness, ten members and guests gathered on the first tee on the Saturday morning to play a Stableford Competition. This was won by the captain, Mr D. Davies. In the afternoon, there was a four ball Stableford Competition which resulted in a tie between Mr Ian Keith and his guest, Mr Ian McIntyre, and Mr David Smith and Mr Arthur McCulloch.

On the Sunday, a four ball match was played against Highwoods Golf Club, and this resulted in a narrow victory by 3 matches to 2 for the home club.

Model Foam Maker

MARTIN Sweets Co. Inc., of Louisville, Kentucky, has developed a miniature model small-shot polyurethane production unit. It is said to be capable of pumping, metering and mixing two-component formulations for rigid, semi-rigid, or flexible foams. The throughput is variable from zero to two pounds per minute. With the self-cleaning, on-off mixing device, it is claimed that shots of mixed materials can be accurately proportioned, dispensed, and reproduced in quantities of a few grams to continuous pours. The unit is self-contained, and includes component tanks, temperature controlling heat exchangers and heated delivery hoses, individual throughput control of materials by positive type variable drives and rotary pumps, unique mixing head and foam cycle controls —and yet measures only 33in. x 26in. with an overall height of 52in.



The unit is already meeting field requirements of research and foam development laboratories as well as the demands of production facilities operating 24 hours per day.

DU PONT SLASH PRICE

The price of 'Hypalon' synthetic rubber has been reduced substantially, announce Du Pont Company (UK) Ltd. All three types available in the UK have been given price reductions ranging from one-third to one-sixth.

The new prices are: 'Hypalon' 20, 4s. a lb.; 'Hypalon' 30, 5s. 0½d. a lb.; 'Hypalon' 40, 4s. 2¾d. a lb. These are all 'delivered' prices. The previous price was the same for all types—5s. 11⅜d. per lb.

Electrical Aids in Industry *Data Sheet* **No. 11**

Dielectric Heating - 2

The ability of dielectric heating to generate heat through the mass of a suitable material provides the following considerable advantages over other heating methods.

1 A body of uniform section and composition is raised in temperature uniformly throughout. Hence there is no waiting for heat to be transferred from an external heat source to the surface of the body and thence to its interior, and this is of particular advantage when the body is thick, and, as is often the case with dielectric materials, has poor heat-conducting properties.

2 The rate of heating of such bodies is, therefore, much faster than by external heating methods.

3 Since there is no external heat source, overheating or burning of the surface of a heat-sensitive material is avoided.

4 High thermal efficiency is achieved.

5 The amount of heat generated in the work is usually predictable and power input and heating time can be under positive control.

6 Production can start immediately after switching on and no current is used, nor heat lost, during periods of shut-down.

7 Vastly increased productivity is obtainable with less labour (usually unskilled), and fewer machines and less floor space are required.

8 Flexibility of layout makes it possible to plan the factory to best advantage, as dielectric heating equipment can usually be inserted directly into the production line.

Dielectric heating: typical application data

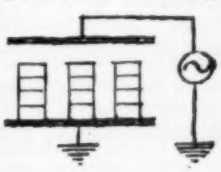
Typical application	Frequency	Radio frequency power
Thermoplastic welding.	20-100 Mc.p.s.	Up to 1 kW
Plastic pre-heating, wood glueing.	10-40 Mc.p.s.	2-30 kW
Plywood manufacture.	2-10 Mc.p.s.	Above 30 kW

Note: 1 Mc.p.s. = 1,000,000 cycles per second.

A few of the industrial applications of dielectric heating are briefly described below.

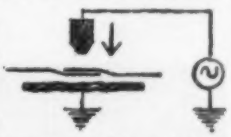
Preheating Thermosetting Plastics

Dielectric heating is the ideal way of preheating moulding powder pellets used in the production of thermosetting plastic mouldings, since these materials are generally poor heat conductors. Properly applied, dielectric preheating promotes faster curing and hence a shorter moulding time, often increasing production ten to fifteen times. There is a marked reduction in tool wear, and thicker sections can be moulded, as the material is plastic when placed in the mould. There is less damage to, and movement of, metal inserts.

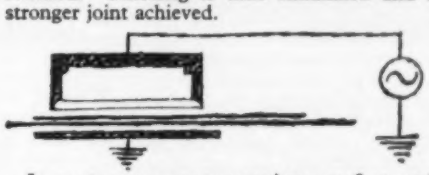


Welding of Thermoplastic Materials

An important and extensive application of dielectric heating in the plastic industry is the welding of thermoplastic sheets in the fabrication of such commonly used articles as raincoats, hoods, handbags, pouches and packaging materials. Dielectric heating is the only method which can usefully be employed since the heating electrodes, and hence the outside sheet surfaces remain cool while the inside surfaces forming the joint are fused, and a perfect weld results.



Two or more thermoplastic sheets are welded under pressure from electrodes suitably shaped to the area of weld required, the current being switched on at the same time as pressure is applied, and off as soon as the weld is completed and the pressure released. Stitching is thus eliminated and a far stronger joint achieved.



In most cases, component pieces are first cut from patterns and preliminary welding carried out to attach any fastening tabs and the like. The pieces are then brought together in a suitable loading frame and the main welding carried out to produce the complete article. In some cases, a suitably profiled electrode can be fitted with a knife edge to cut the sheets immediately outside the weld line, welding and pattern cutting being thereby carried out in the one operation. Dielectric welding can be applied also to very large thermoplastic products such as linings for swimming pools, and cinema screens.

Drying

Drying of materials by dielectric heating has the great advantage that the material tends to dry out from the centre, the reverse of what happens when external heating methods are employed, and the risk of overdrying and overheating of the surface is eliminated. In general ½ to 1 unit of electricity is required to drive off 1 lb. of moisture, depending upon the thermal properties of the material being dried. While the removal of large amounts of water from inexpensive commodities may sometimes be uneconomical, dielectric heating in the production line often leads to a higher overall production efficiency. It is valuable for removing final moisture traces and becomes increasingly economical as the value or heat-sensitivity of the commodity increases.

Rubber

External heating tends to dry and cure the surfaces of a thick latex mass before its centre, but dielectric heating properly applied promotes uniform conditions throughout.

Loaded rubber may not heat uniformly in a dielectric field due to uneven dispersion of its load, but nevertheless rubber preforms loaded up to about 15% are preheated dielectrically to reduce moulding times appreciably, the temperature evening out in the mould to give uniform curing.

Further examples are given in Data Sheet No. 12.

For further information get in touch with your Electricity Board or write direct to the Electrical Development Association, 2 Savoy Hill, London, W.C.2. Telephone: TEMple Bar 9434.

Excellent reference books on electricity and productivity (8/6 each, or 9/- post free) are available — "Induction and Dielectric Heating" is an example.

E.D.A. also have available on free loan in the United Kingdom a series of films on the industrial uses of electricity. Ask for a catalogue.

4774

Advertisers Announcement

CUT HERE

Institution of the Rubber Industry

REPORT ON THE 1959 EXAMINATIONS

(Continued from March 5 issue, page 362)

RUBBER TECHNOLOGY I

The general standard of papers submitted in this examination was disappointing, but there were a few candidates who showed a wide range of knowledge and a methodical approach.

The basic knowledge of compounding appears to have improved, although the extent of reinforcement produced by fine particle powders was not always appreciated. In describing calender processes, several candidates seemed to have difficulty in indicating the location of feeds and take-offs and, indeed, of the directions of rotation of the bowls. In descriptions of cold cure processes, there were frequent references to carbon disulphide as a solvent for sulphur monochloride. This is an obsolete practice—objectionable both on the grounds of toxicity and of expense.

Q. 1. *What are the main differences between the types and grades of commercial raw natural rubber? Discuss attempts that have been made to put the grading on a more technical basis. Suggest compounding methods by which the cheaper types and lower grades can be used.*

Answers to this were disappointing—most students had only a vague knowledge of the types of raw rubber and their properties.

Q. 2. *In one of the compounds in use in your factory it is suspected that there is bad dispersion of the carbon black (HAF). Describe methods to check this suggestion. Give processing and compounding modifications to overcome poor dispersion.*

Very few candidates knew the Leigh-Dugmore or Drogin techniques for assessing dispersion. Many mentioned the electron microscope, which would not normally be available in a factory laboratory.

Q. 3. *Discuss the advantages of using blends of polymers of which only one is vulcanizable. Illustrate your answer with typical compounds.*

This was reasonably well done. A few students did not read the question and described mixtures of two vulcanizable polymers.

Q. 4. *What safety precautions should be observed in the millroom? Comment on accident and health hazards.*

Again reasonably well answered. Most candidates described in detail the Lunn guard for works mills. Health hazards were not well understood.

Q. 5. *You are required to design compounds for the following products; give reasons for selecting each ingredient and state the vulcanizing conditions: (a) vaccine caps for use with penicillin, (b) a hard neoprene gasket for intermittent use in contact with steam at 20 p.s.i., (c) a light coloured floor tile based on styrene-butadiene rubber.*

The basic knowledge of compounding was reasonable, but many students failed to modify their compounding to meet the special needs of the application—for example, the lead oxide cure of neoprene. A number did remember this, but put it in as well as MgO. Many students also failed to remember that, in contrast to NR, SBR needs *reinforcement* in light colours.

Q. 6. *Describe the manufacture of latex foam cushions or mattresses. Give an outline of the tests used to control the quality of these products.*

All the answers to the first part were excellent, but the knowledge of testing was bad.

Q. 7. *Explain how, and for what reasons, four of the five following chemicals are used in rubber: (a) N-oxydiethylene-2-benzthiazyl sulphenamide, (b) Dioctyl-p-phenylene diamine, (c) Benzoic acid, (d) Diethylene glycol, (e) N-N-diphenyl-p-phenylene diamine.*

There was considerable confusion between (b) and (e). A number of candidates also thought (a) was straight CBS. Reasons for use were sparse.

Q. 8. *What do you understand by 'coefficient of vulcanization'? How has its significance been influenced by developments in vulcanization agents and accelerators?*

No comment.

RUBBER TECHNOLOGY II

Q. 1. *Compare the design and properties of racing car tyres with those used for touring. How does car racing experience influence standard tyre design?*

This was attempted by about 50% of the candidates and some very thoughtful answers were returned.

Q. 2. *How would you make and test protective rubber gloves suitable for use by: (a) paint sprayers, (b) electricians, (c) operatives handling oily metal parts?*

A popular question answered by 75% of entrants. The selection of suitable polymers was well done as also was basic (vulcanization) compounding, but the degree of reinforcement indicated was generally too great for the applications.

In dealing with testing, few referred to simple tests such as inflation. Most candidates concentrated on 'destructive' tests on the materials only.

Q. 3. *Describe three methods of rubber-proofing fabrics for garment manufacture. What are the advantages and limitations of each method?*

This was very popular, being answered by 90% of entrants. Some candidates gave a calender-frictioning process as one of the methods. Although this is a good preparation for a topping process, it is not considered, by itself, to constitute a proofing process, and therefore marks were lost.

The methods of vulcanizing the coated fabrics were not always stated. More thought should be given to the most desirable methods of proofing for various weights and types of fabric, and their service applications.

Q. 4. *Describe apparatus and methods you would use to evaluate, in the laboratory, the abrasion resistance of compounds designed for the following purposes: (a) tyre treads, (b) resin-rubber soling, (c) sand-blast hose linings.*

Sixty per cent. of the candidates tried this one; the standard of answers was generally good.

*Q.*5. *How would you produce from scrap tyres materials suitable for each of the following requirements in mechanical mouldings: (a) lowest volume cost, (b) highest tensile properties? Illustrate your answer with suitable compounds.*

This question aimed at finding out a candidate's knowledge and resource in using waste vulcanized rubber. While all candidates knew some methods of reclaiming some were also familiar with the use of waste in crumb form. The weaker candidates specified generous proportions of crude rubber in their higher tensile compounds, and merely reduced their crude content to achieve a lower cost material.

Q. 6. *Describe factors, including manufacturing improvements, which have favoured the use of V-belts in place of flat transmission belts. Describe the laboratory tests that can usefully be applied to each type of belt.*

This question was answered by 40% of candidates. A few answers were very good and indicated an intimate knowledge of the subject.

Q. 7. *Discuss the possibilities of the use of butyl rubbers for car tyre manufacture. Indicate the practical problems involved.*

Nearly all candidates answered this question. A good knowledge of recent literature on the subject was displayed, but practical handling difficulties and methods of overcoming them were not so well covered.

Q. 8. *Compare the production processes and economics of wrapped and lead-pressed delivery hoses. Comment on the textile requirements of the two types.*

This question was answered by about a third of the candidates. Knowledge of the processes was generally quite good, but the fabric side was not adequately dealt with.

R. C. W. MOAKES.
E. H. HURLSTON.

(*To be continued*)

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Plastics Statistics

FEBRUARY IMPORTS AND EXPORTS

IMPORTS of plastics materials during February 1960 were 6,159 tons, valued at £1,893,159. This is nearly twice the figure for the same month last year, which was 3,221 tons (£1,281,365). This is disclosed in the official Trade and Navigation accounts, which show that USA continued to be the major supplier (2,014 tons; £758,129) with West Germany a close second (1,720 tons; £546,838). These figures mean that West German imports have increased by 70% over February 1959; USA's have gone up by 52%. Total imports for the year so far are 13,672 tons worth £4,282,666, compared with 1959 figures of 6,907 and £2,601,438.

Exports for February amounted to 13,934 tons, valued at £3,481,664; 1959 figures were 11,475 tons and £2,918,971. Of the month's total Italy took 1,340 tons worth £297,626; South Africa 1,132 tons—£243,991; Australia 1,022 tons—£397,943 and Hong Kong 994 tons—£228,043. Total exports for the year so far are 28,466 tons (£7,355,689) compared with 1959 figures of 23,115 tons (£5,903,751).

Details of imports of plastics materials during February 1960 are as follows:

	Tons	£
Alkyd solid and liquid resins, solutions, emulsions and dispersions	188	42,080
Cellulose plastics:		
Photographic (including cinematograph) film base (except acetate butyrate)	124	154,929
All other	173	116,811
Polyvinyl chloride:		
Polymers and copolymers	1,417	189,489
All other	465	176,386
All other	3,792	1,213,464
Total	6,159	1,893,159

Exports of plastics materials during February 1960:

	Tons	£
Acrylic sheet, rod, tube, film, foil and profile shapes in primary form	507	303,935
Alkyd solid and liquid resins, solutions, emulsions and dispersions	558	97,771
Aminoplastics:		
Solid and liquid resins, including solutions	774	95,089
Moulding and extrusion compounds	683	121,019
Cellulose plastics:		
Moulding and extrusion compounds	222	76,905
Sheet, rod, tube, film (excluding regenerated cellulose), foil and profile shapes in primary form	217	111,925
Phenolics and cresylics:		
Solid and liquid resins (straight and modified)	702	153,845
Other	506	204,297
Polystyrene	619	135,326
Polythene (polyethylene) sheet, rod, tube, film, foil and profile shapes in primary form	154	61,159
Polyvinyl chloride:		
Polymers and copolymers	1,697	246,556
Moulding and extrusion compounds	931	205,617
Sheet	662	279,465
Other	61	21,037
All other	4,884	1,285,178
Waste and scrap (including celluloid and film waste and scrap)	757	81,540
Total	13,934	3,481,664

UK exports to countries in the European Economic Community (Common Market) and the European Free Trade Association are shown below.

EXPORTS TO EEC

	Feb. 1959	Feb. 1960
Western Germany	203	653
Netherlands	745	521
Belgium	264	493
France	686	299
Italy	336	1,340
	2,234	3,306

EXPORTS TO EFTA

	Feb. 1959	Feb. 1960
Sweden	468	750
Norway	362	342
Denmark	544	487
Switzerland	255	264
Portugal	282	312
Austria	171	123
	2,082	2,278

Exports to Commonwealth countries during the month were 4,761 tons (3,424 in February 1959) and exports to all other foreign countries were 3,595 tons (3,735 tons).

COMPANIES in the NEWS

Northwestern Rubber

The annual general meeting of Northwestern Rubber Company Ltd. was held in Liverpool, Mr J. S. Shaw (the chairman) presiding.

In the course of his report at the annual general meeting of the Northwestern Rubber Co. Ltd., the chairman, Mr J. S. Shaw, said that the period of fifteen months under review had been an eventful one for the company. It had opened badly, there being a surplus of reclaimed rubber over the whole world. Signs of improvement appeared in the Spring and from June onwards the difficulty had been to meet all the demands made upon them. In the last six months new production records had been achieved.

Commenting on the programme of modernization and capital expenditure, the Chairman said: We have at present under active consideration plans to complete the modernization of the factory at the end of which we expect our production to be almost double what it was a year ago.

Pirelli

Societa Pirelli per Azioni has approved payment of a dividend of 140 lire per share for 1959. Net profits of the company last year amounted to 3,630,863,148 lire against 3,570,658,961 previously. The company successfully increased the use of synthetic rubbers. The manufacture of electric cables increased but profits from the manufacture of tyres were reduced because of fierce competition, the report to the shareholders' meeting added.

Corrosion Problems

The British Association of Corrosion Engineers has been elected a member of the European Federation of Corrosion. This non-profit-making union promotes European co-operation in the field of research on corrosion and methods of combating it.

The General Secretariat of the Federation is managed jointly by the DeChema in Frankfurt a.M. and the Societe de Chemie Industrielle in Paris. The British Association of Corrosion Engineers was formed last year generally to promote the dissemination of technical information about corrosion matters. Individual membership is two guineas a year and the address is 97, Old Brompton Road, London, S.W.7.

Mr Robert J. Pritchard and Mr Peter R. Pritchard have been appointed directors of Kapoewas Rubber Co. in succession to Lt.-Colonel F. W. S. Roberts, Major R. F. Burt and Mr W. L. Cowley who have resigned from the Board.

Rubber Statistics

WORLD POSITION AT THE END OF JANUARY

THE Secretariat of the International Rubber Study Group has now released preliminary details of the world rubber position as at the end of January last. The following table shows the natural rubber production and consumption totals for January (in 1,000 long tons):

NATURAL RUBBER

	Jan. 1960	Year 1959	Year 1958
Production	170.0	2,065.0	1,957.5
Consumption	182.5	2,105.0	1,980.0

Stocks at January 31:		Change since Jan. 1, 1960
Producing areas ..	255.0	—
Consuming areas ..	200.0	– 2.5
Afloat	220.0	–10.0
	675.0	–12.5

The Study Group states that the January consumption total includes estimated imports into Russia of 14,500 tons and into China of 26,000 tons. Last year imports into these two countries totalled 232,250 tons and 143,750 tons respectively, representing about 17% of the total amount of natural rubber consumed throughout the world during 1959.

Synthetic Rubber

The synthetic rubber position is set out in the following table:

SYNTHETIC RUBBER

	Jan. 1960	Year 1959	Year 1958
Production	160.0	1,632.5	1,242.5
Consumption	140.0	1,557.5	1,247.5

		Change since Jan. 1, 1960
Stocks at Jan. 31	315,000	+ 5.0

Production of synthetic rubber continues to outrun consumption as indeed it did during 1959 as a whole. This contrasts with natural rubber, where production fell some 40,000 tons short of the consumption figure.

US General Position

The US Department of Commerce has now issued the following preliminary statistics for the month of February (in long tons):

NATURAL RUBBER

Consumption:
46,018 tons, of which latex 5,459 tons
Stocks:
75,320 tons, of which latex 12,974 tons

SYNTHETIC RUBBER

	Production	Consumption	Stocks
S-type ..	104,603	77,010	186,166
Butyl	6,514	5,980	12,532
Neoprene ..	12,106	7,288	13,787
N-type ..	3,000	2,829	8,541
	126,223	93,107	221,026

Total new rubber consumption during February amounted to 139,125 tons, or some 2,000 tons less than in January. Natural rubber accounted for 33.08% of total rubber consumption, compared with 34.13% for 1959 as a whole.

Sole Crepe

The Study Group has recently published details of sole crepe exports from Malaya and Ceylon for January. In the case of Malaya these totalled 885 tons, of which the United Kingdom took 389 tons. Other countries buying Malayan sole crepe included Spain (207 tons), France (53 tons), Japan (51 tons) and the Netherlands (41 tons).

Ceylon's sole crepe exports during January totalled 105 tons, Poland being the main customer and taking 70 tons.

The Study Group also states that Vietnam exported 216 tons of sole crepe in January, and 103 tons in February, all but three tons being taken by France.

Belgian Congo

Details are now available of rubber exports from the Belgian Congo during the last quarter of last year. These amounted to 11,483 tons, and brought the total for the year's exports to 39,511 tons, an increase of about 5,000 tons compared with the 1958 figure.

The greatest tonnage (14,329 tons) went to the USA, Belgium taking second place with 10,701 tons. Other countries to take considerable quantities of this rubber included France (5,943 tons), the Netherlands (3,142 tons) and Western Germany (2,364 tons). The United Kingdom only took 604 tons of the Belgian Congo's rubber during 1959.

Canada

Imports of natural rubber into Canada up to the end of November last totalled 37,709 tons of crude and 3,470 tons of latex, and exceeded the previous year's figure by some 7,500 tons. Of this amount, Malaya provided 29,985 tons, the USA 5,578 tons and Ceylon 3,982 tons; Malaya accounted for almost all the increase compared with the earlier period.

Consumption of natural during these months amounted to 37,960 tons of crude and 3,120 tons of latex, which in this case represented an increase of almost 8,000 tons over the previous year. Stocks on hand at the end of November stood at 3,566 tons, having fallen by some 900 tons during the course of the year.

Home production of synthetic during the first eleven months of the year amounted to 87,719 tons, and included 53,408 tons of S-Type and 16,592 tons of butyl; it represented roughly only two-thirds of the previous year's production, the decline in output having been occasioned by prolonged strikes. In addition to home produced synthetic, a further 28,651 tons were imported almost all from the USA; this was nearly three times the amount imported in 1958, and here again, the strikes in the home plants probably account for the increase. Canadian consumption of synthetic during these months amounted to 52,519 tons, as compared with a consumption figure of 42,412 tons for the earlier period, and included 44,709 tons of S-Type, 2,717 tons of neoprene and 4,460 tons of butyl. Stocks of synthetic on hand at the end of November stood at 8,785 tons, having fallen by about 1,600 tons during the course of the year.

Reclaim rubber production during these months totalled 5,680 tons, while consumption, after allowing for imports of reclaim, amounted to 15,751 tons. Stocks of reclaim, which at the beginning of the year had stood at 1,400 tons, had risen to 1,719 tons by the end of November.

Japan

The Japanese Rubber Manufacturers' Association announced that in February, Japan produced 15,481 tons, in terms of crude rubber consumed, of articles containing either natural or synthetic rubber. This was more than 4,000 tons above the consumption figure for the previous February, and 1,406 tons more than the January 1960 figure.

Motor car tyres and tubes accounted for 5,982 tons in February, as against 5,359 tons in January and only 3,818 tons in February of last year. Rubber shoes rose from 1,105 tons in the earlier month to 1,561 tons, while miscellaneous industrial uses went up from 1,511 tons to 1,943 tons. Rubber-soled canvas shoes accounted for 1,041 tons.

Dome and Mesh

The Elgin Engineering Co. (Pty.) Ltd., P.O. Box 84, Jacobs, Natal, are making bus bodies for the transport fleet of Mills Transport, Durban. A feature of the construction is a full-swept windscreen with a new type fibre glass dome. The panels are of 20 Zintex.

Netlon mesh produced in the plant of Pretoria Industrial Plastics, Pretoria, is now being introduced locally for the retail packaging of fruit and vegetables. Retailers will have to be equipped with 'dispensing' machines into which continuous rolls of Netlon are fed, and once the purchases have been fed into the package it is cut off automatically and heat sealed.

PATENT SPECIFICATIONS

The following information is prepared from published Patent Specifications by permission of the Controller of H.M. Stationery Office. The full Specifications can be obtained from the Patent Office, 25 Southampton Buildings, W.C.2, at 3s. 6d. per copy (including postage).

Threads of Polyurethane Foam

No. 825,838. W. Simon. Application and Filed, November 4 1955. Application in Germany, November 4 1954 and March 25 1955. Published, December 23 1959.

Threads of polyurethane foam having open cells are obtained by cutting a sheet of foam, preferably by first winding a sheet into a roll and then cutting the roll at right-angles to its cylindrical axis. The threads of polyurethane foam may be strengthened by means of threads of natural or synthetic material, the two threads being arranged parallel or twisted together or the thread of foam being used as a core. The threads of polyurethane foam are used as an alternative to wool; it is stated that the foam threads have the valuable properties of wool without its disadvantages.

Ethylene Copolymers

No. 826,178. E. I. du Pont de Nemours and Co. Application and Filed, February 22 1957. Application in USA, March 1 1956. Published, December 31 1959.

Ethylene is copolymerized with a mono-alpha-olefin by means of a co-ordination catalyst. The olefin preferably contains 5 to 10 carbon atoms in the molecule, examples of suitable olefins being heptene-1, pentene-1 and decene-1. The copolymers have a considerably higher tear strength than branched chain ordinary polythene and are particularly useful for films or coatings on paper. Other applications of the copolymers are for squeeze bottles, tubing, extruded coatings on electrical conductors, ice cube trays and sundry other products. The copolymers are resistant to solvents and to cracking and have excellent pneumatic impact properties.

Thermoplastic Compositions

No. 826,540. United States Rubber Co. Application and Filed, February 26 1958. Application in USA, May 10 1957. Published, January 13, 1960.

A hard, tough, thermoplastic mixture having a transparency of at least 30% of visible light when in the form of a sheet ¼in. thick, comprises a homogeneous blend of three components as follows: (1) 75 to 95% of PVC or a resinous copolymer of vinyl chloride and vinyl acetate. (2) 2.5 to 12.5% of a rubbery copolymer of butadiene and acrylonitrile or methyl methacrylate. (3) 2.5 to 20% of polychloroprene (neoprene). Preferably, there is used a blend of components (2) and (3) which has a refractive index equal to that of component (1). In preparing the compositions, components (2) and (3) are mixed together and then blended with component (1).

In an example, the composition consisted of 80% of a vinyl chloride—vinyl acetate copolymer, 10% of a butadiene-methyl methacrylate copolymer and 10% of Neoprene GN. A sheet of the composition, ¼in. thick, transmitted 54% of visible light and had the following properties: Notched Izod impact strength about 1ft. lb./in., Rockwell hardness about 95 R and flexural modulus about 300,000 psi.

Shorter Abstracts

Vinyl Esters of Terephthalic Acid. 824,856. W. Schemuth. Filed, May 10 1956.—Vinyl esters of terephthalic acid are claimed, particularly the monovinyl ester, the divinyl ester and the monomethyl-monovinyl ester.

Vinyl Chloride Copolymers. 824,897. Société des Usines Chimiques Rhone-Poulenc. Filed, February 5 1958.—New copolymers of vinyl chloride which are stable to heat and light comprise a major proportion of vinyl chloride and a minor proportion of an organo-tin compound having a vinyl group attached directly to a tin atom.

Moulding Polythene. 824,959. Chemische Werke Hüls AG. Filed, October 11 1956.—Polythene is heat-treated for a short time at a temperature above 220°C., cooled and granulated, and the granulated material is then moulded by known methods at temperatures below 220°C.

PVC Solutions. 825,032. Montecatini Societa Generale per l'Industria Mineraria e Chimica. Filed, February 25 1958.—A mixture of trichlorethylene and nitromethane is used as a solvent for PVC.

Testing Polymeric Materials. 825,231. Minister of Supply. Filed, January 17 1958.—Apparatus is described for determining the energy absorbed when a body is allowed to fall on and rebound from a specimen of a polymeric material. The apparatus is designed for operating the test at a series of temperatures in order to determine the dynamic second order transition point of the polymeric material.

Extruder. 822,812. The Goodyear Tire and Rubber Co. Filed, February 24 1956.—In an extruder for plastics, a perforated screen or filter is moved transversely through the stream of plastic material before the stream reaches the forming die. The use of the screen prevents the formation of die or closure lines on the extruded material.

BOOK REVIEW

INTRODUCTION TO RUBBER TECHNOLOGY.—Edited by Maurice Morton. (New York: Reinhold Publishing Corporation. London: Chapman and Hall Ltd., 1959, pp. v, 547. Price 80s.)

This book is a compilation of selected lectures delivered at rubber technology courses held by various Rubber Groups in the USA. The 24 contributors, all Americans, are specialists in the particular branches of rubber technology on which they write, while the editor is Director of the Institute of Rubber Research, University of Akron.

The scope of the book is indicated by the subjects of the 20 chapters as follows: History and summary of rubber technology; introduction to polymer chemistry; natural rubber; vulcanization; accelerators; antioxidants and antiozonants; plasticizers and extenders; carbon black; non-black compounding ingredients; SBR; nitrile and polyacrylate rubbers; butyl rubber; neoprene; Hypalon; polysulphide polymers; silicone rubbers; reclaimed rubber; latex, sponge rubber and foam rubber; physical testing; and processing equipment.

The author of chapter one attempts to show graphically the technical structure of the rubber industry and the flow of ideas through it. As he observes, 'Compounding is the backbone of this chart. This is a true picture of the situation.' It is appropriate therefore that several separate chapters of the book should be devoted to compounding ingredients and their effects in rubber while additionally, specialized compounding appropriate to the various synthetic rubbers is discussed in the chapters on these rubbers. Although reference is made in various parts of the book to compounding of certain end products, the emphasis is on basic principles rather than on the compounding requirements for particular rubber articles.

The exclusive American authorship has some disadvantage for British readers, particularly in certain chapters. For example, the list of commercial antioxidants in chapter six is limited to products of American manufacture while only ASTM standards are referred to in the chapter on physical testing.

This is an excellent book to put into the hands of the young technologist embarking on a career in the rubber industry. It will be of interest also to many not-so-young technologists and to others in the industry desirous of improving and bringing up to date their knowledge of basic rubber technology.—R. W. P.

∴ Copies may be ordered through the Books Department, RUBBER JOURNAL AND INTERNATIONAL PLASTICS, Maclaren House, 131 Great Suffolk Street, London, S.E.1.

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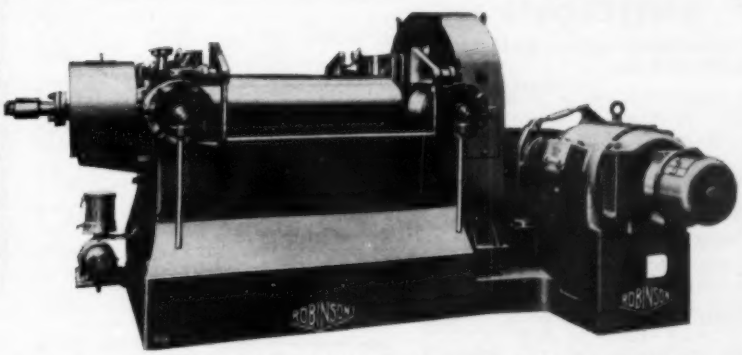

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Rubber Markets

LONDON

Prices in the London rubber market are again easier following the previous week's decline in response to the terms of the US stockpile release. Trading has been at a low level in front of the holiday, however, and further losses are small. The Spot is another ¼d. down at 34⅜d. per lb. and losses in forward positions do not exceed a ¼d.

Latest prices are as follows:

No. 1 RSS Spot: 34¼d.-34½d.

Settlement House:

May 34⅜d.-34½d.

June 34d.-34¼d.

July/September 33⅝d.-33¾d.

October/December 33d.-33⅛d.

January/March 32¼d.-32⅜d.

April/June 31⅞d.-32d.

No. 1 RSS cif basis ports:

April 34¼d.-35d.

May 34⅜d.-34⅝d.

Godown:

April 118½ Straits cents nominal.

LATEX

Centrifuged latex per gallon in drums, seller, May 20s. 3d., cif European ports, Spot, d.w. 20s. 8d. Bulk, d.w. 19s. 10d. Creamed, seller, May 19s. 9d. Normal, seller, May 15s. 8d.

AMSTERDAM

The Amsterdam rubber market ruled as under on April 11:

	Guilders per kilo	
No. 1 RMA	April 11	Previous
April	3.39	3.39
May	3.39	3.39
June	3.39	3.39
April/June ..	3.39	3.39
July	3.29	3.29
August	3.28	3.29

Sales: Nil. Tendency: Quiet.

DJAKARTA

Seventy tons of several varieties of sheet No. 1 were traded at 42.50 to 43.25 rupiahs per kilo on April 11. About 20 tons of sheet No. 2 were sold at 41.50 to 42.25 rupiahs per kilo. The market closed very steady, demand surpassing offerings.

	Rupiahs per kilo	
	Apr. 11	Previous
Spot No. 1 Priok ..	42.50b	41.50b
Spot No. 2 Priok ..	41.50b	40.50b
Spot No. 3 Priok ..	40.50b	39.50b
No. 1 fine pale crepe spot	38.50b	38.00b

Tone: Very steady.

SINGAPORE

There was little incentive to trade and the market ruled quiet on April 11. Some steadiness was due to Chinese enquiry towards midday, but this was short-lived. Lower sheets were neglected. Lower-grade interest was good and fair business was transacted. Factories were quiet. After hours the market was easy.

	Straits cents per lb., fob Malayan ports to open ports	
	Apr. 11	Previous Close
No. 1 RSS, Apr.	119⅝–119¾	119⅞–120⅛
May	119¼–119½	119¾–120
No. 2 RSS, Apr.	117⅞–118⅛	118 –118⅜
No. 3 RSS, Apr.	114⅝–115¼	114⅞–115⅜
No. 4 RSS, Apr.	113½–114¼	113⅝–114⅜
No. 5 RSS, Apr.	111 –111½	111 –112
No. 1 RSS, Spot	119¼–119⅞	119⅝–120⅛
No. 3 blanket, thick remilled, crepe, Apr. ..	112 –114	112¼–114½
No. 1 fine pale crepe, Apr. ..	129¼–130¼	129¾–130⅞
2X thin brown, crepe, Apr. ..	111⅞–112⅞	112¼–113¼

Tone: Easy.

The Industries Syndicate quote latex, native produce, 60% centrifugal, packed in rectangular drums fob at 231.00d. per gallon.

BANGKOK

No. 1 RSS

The price of No. 1 RSS at Bangkok on April 11 was 37.50 (37.50) US cents per lb.

NEW YORK

The New York rubber market ruled as under on April 11:

DEALERS' PRICES

	US cents per lb. ex-dock	
	Apr. 11	Previous
No. 1 RSS, April ..	40⅜n	40¼a
May ..	40¼a	40⅛b–40¼a
No. 2 RSS, April ..	40⅜n	40⅜n
May ..	40¼n	40¼n
No. 3 RSS, April ..	40¼n	40¼n
May ..	40a	40b–40¼a
No. 1 RSS, Spot ..	40⅜n	40¼a
No. 3 amber blanket crepe, June ..	39⅛n	39⅜n
No. 1 latex thin crepe, April	45n	45⅛n
No. 1 latex thick crepe, April ..	44⅜n	44⅛n

FUTURES—REX CONTRACT

	Apr. 11	Prev. Close
May ..	40.00b–40.10a	40.30t
July ..	39.45t	39.70b–39.80a
September	39.00b–39.10a	39.25t
November	38.50b–38.75a	38.90t
January..	38.00b–38.35a	38.30b–38.45a
March ..	37.50b–37.85a	37.65b–37.80a
May ..	37.00b–37.40a	37.20b–37.50a

Sales: 29. Tone: Steady.

Rubber futures steadied after early softness on April 11. Trading for the day was slow. Physical rubber was quiet. Traders noted that shipment rubber offerings from the Far East were too high priced for this market. In the closing stages futures declined on scattered selling.

CEYLON

No. 1 RSS

The price of No. 1 RSS at Colombo on April 11 was 139 (139½) Ceylon cents per lb.

Enka to Establish Nylon Yarn Plant

British Enka and its Dutch parent company, Algemene Kunstzijde Unie (AKU), are to establish in the UK a plant to produce nylon yarn and nylon plastic materials. Plans are at an advanced stage, it is stated.

The AKU group has already successfully built 'Nylon 6' manufacturing units in the Netherlands, Germany, the US and Italy. All know-how and research facilities resulting from this experience will be made available to the new project. Further details are to be announced shortly.

British Enka, in which AKU has a 54% interest, is one of two producers of rayon yarns for the motor tyre industry and one of the principal producers of continuous filament rayon textile yarns. Its factory is on a 60-acre site at Aintree, Liverpool.

Carbon Black Conference

Representatives from eleven European countries attended the European Carbon Black Conference which opened in London on April 12. It is organized by Columbian Carbon, whose president told the conference that West Europe's economic vitality indicated a tremendous carbon black potential in the Common Market and Outer Seven.

Adhesive Manufacturers' Association

At the annual general meeting of the British Rubber and Resin Adhesive Manufacturers' Association, held in St. Albans on April 7, the following officers were elected for 1960-61: Chairman, Mr N. G. Bassett Smith, Dunlop Rubber Co. Ltd.; vice-chairman, Dr H. Simon, Evode Ltd.

Capital Up

The paid-up capital of Chautard and Co. (Rubber) Ltd., Plantation House, London, E.C.3, has been increased from £100,000 to £150,000.

Trevor Chubb has been appointed assistant general sales manager of the Rubber Regenerating Co. Ltd. Mr Chubb, who is a graduate of Manchester University, joined the company in 1955.

Mr R. S. Silman and Mr E. P. Arundell have been appointed to the board of Ship Carbon Company of Great Britain, a subsidiary of the Morgan Crucible Company.

Industry INTELLIGENCE

Technical Data

Butyl Rubber for Low-Voltage Insulation

Two butyl rubber compounds, one black and the other coloured, have been developed for low-voltage insulation. Details of the compounds and data for the properties of the vulcanizates are given in Technical Information Sheet No. 20, available from Esso Petroleum Co. Ltd., Chemicals Department, 50 Stratton Street, London, W.1.

The black compound was developed for low-voltage block (telephone ringing circuit) and power wire insulation, and the coloured compound for multiconductor drop (pole to house) wire. Both compounds meet initial physical and electrical requirements for low voltage insulation but long-term weathering experience is not yet available. However, based on laboratory tests, no major difficulties are anticipated in meeting commercial requirements. It is a common practice in low-voltage applications to use a two-layer sheathing on the conductor, the inner layer of one type of rubber serving as the insulation and the outer cover of another type of rubber protecting the insulation against the effects of ozone and ageing. The production of this type of insulated wire involves a two-step extrusion. However, as butyl rubber possesses both good insulation and good resistance to ageing, it can function as both the insulation and the protective cover. This presents the possibility of employing a single-step extrusion with butyl rubber instead of a two-step process.

Antioxidant 425

Antioxidant 425 imparts excellent age-resisting properties to rubber combined with minimum tendency to discolour light-coloured compounds on ageing and minimum staining of lacquers and enamels with which the compounds come into contact. Data for the chemical and physical properties of Antioxidant 425 and details of its behaviour in rubber are given in Report No. 148/R/60, issued by the Anchor Chemical Co. Ltd., Manchester 11.

Chemically, Antioxidant 425 is 2,2'-methylene bis-(4-ethyl-6-tert-butyl phenol). A proportion of 0.5 to 1.5 phr is recommended for most white or light-coloured compounds, although 0.25 to 0.5 phr may be sufficient to meet the service requirements of some stocks. Data are given showing the improvement in resistance to ageing achieved by the use of Antioxidant 425 in three natural rubber compounds, namely, a white general purpose stock, a white bathing cap stock and a white latex compound. Its protective value against oxygen is excellent, against heat is good and against surface crazing is satisfactory. Antioxidant 425 is recommended for use in white sidewalls, bathing caps, hot-water bottles, footwear, rubber and latex thread and other latex compounds.

Manosil VN3 in Translucent SBR Compounds

An investigation has been made of the effect of various compounding ingredients and types of SBR on the properties of translucent SBR compounds containing 50 phr of Manosil VN3, a silica filler. The results are reported in Technical Service Note No. 15 issued by Hardman and Holden Ltd., Manox House, Miles Platting, Manchester 10.

The investigation covered the effect of processing aids and activators and of accelerator systems, while three different brands of oil-extended SBR and two different brands of straight SBR were compared. Generally, little difference in physical properties was found between the various SBR polymers although the oil-extended polymers gave softer vulcanizates than straight SBR. Manosperse T, a processing aid, and Activator R were included in the study. The accelerator systems used comprised combinations of HMT with two other accelerators selected from MBT, ZMBT, MBTS, CBS, ZDC, DPG and TMT. The compound containing the highest proportion of accelerator (CBS 1.0, DPG 1.5, HMT 1.0) was the deepest in colour and was graded as amber; it was also the clearest in transparency. The compound next in clarity contained MBT 1.0, DPG 1.0 and HMT 1.0. Compounds containing MBT 1.5, DPG or ZDC 0.4 and HMT 1.0 were the least transparent. It is mentioned that the main outlet for translucent rubber compounds has been for moulded sole-and-heel units, although interest in translucent soling compounds for direct vulcanization is increasing.

Machines, Materials and Equipment

Dreher Granulator

Baker Perkins of Peterborough claim a large sale for a granulator which has a high throughput but does not generate excessive heat.

This machine—the Dreher Granulator—is of the rotary knife type. It is supplied in four sizes—for nominal outputs of 25, 100, 250 and 500lb. per hour. Power for the drives can be varied for different applications, and special versions have been developed recently to handle plastic foams and thin films.

Extrusions, mouldings, sprues and other scrap in PVC, polythene, polystyrene, nylon and foams, have been granulated. Mesh screens have been located in relation to the rotary knives in such a way that heat is kept low and grains of uniform size are produced.

New Publications

Pye Catalogue

The latest edition of the Pye Scientific Instrument Catalogue describes several important developments of interest to those concerned with scientific research or industrial production testing and process control. Among these developments are a stabilized power supply unit; DC amplifier (contact modulator); new range of measuring microscopes and cathetometers; precision decade potentiometer; *p*H extension meter; autotitrator-controller; automatic determination of sulphur content apparatus; industrial flow type electrode assembly; industrial density measuring equipment, and Argon cromatograph with new accessories.

The catalogue can be obtained from W. G. Pye and Co. Ltd., Granta Works, P.O. Box 60, Cambridge.

Philblack I in Various Polymers

British Philblack Bulletin No. 20 gives basic properties of Philblack I compared with Philblack O, HAF black, in natural rubber, cold SBR (Philprene 1500) and oil extended SBR (Philprene 1712) at various loadings.

The natural rubber compounds were mixed on a two roll laboratory mill and test data agree with previously published work on ISAF blacks. The OEP compounds were mixed in a size B laboratory banbury and test data agree with previously published work on ISAF. It has been found that open mill mixing of OEP compounds containing carbon black does not give such good physical properties as internal mixing machines yield, unless a masterbatching technique as described in British Philblack Bulletin No. 16 is employed. Open mill mixing was therefore not attempted in the present work.

The SBR 1500 results are particularly interesting because work published in British Philblack Bulletin No. 15 indicated the necessity for adequate mastication of base polymer prior to addition of compounding ingredients, hence an 8-minute breakdown on cold rolls was given in all cases, followed by conventional mixing on the mill. The Bulletin notes that it may not be commercially attractive in all cases to give such thorough mastication but nevertheless there will doubtless be instances where advantage may be taken of this phenomenon.

Future Events

PLASTICS INSTITUTE

Midlands Section. — Monday April 25 at the Queen's Hotel, Birmingham. Annual luncheon.

North-Eastern Section. — Wednesday April 20 at the Eldon Grill, Newcastle, at 7 p.m. Annual general meeting.

Scottish Section.—Wednesday April 20. Visit to Mechan's Ltd., Scotstoun Iron Works, Glasgow.

Southern Section.—Saturday April 23 at 2.30 p.m. Visit to Southampton Gas Works.

Western Section.—Wednesday April 20 at Stroud Technical College at 7 p.m. 'Thermosets: New Materials, New Methods, New Problems,' by J. Butler (British Industrial Plastics Ltd.).

PATENT LIST

Printed copies of the Specifications in the following list, published by permission of the Controller of H.M. Stationery Office, can be obtained from the Patent Office, 25 Southampton Buildings, Chancery Lane, London, W.C.2, price 3s. 6d., including postage, but about six weeks after the date of this publication will usually elapse before they come available. Orders with remittance may be sent in advance to the Patent Office, and will be fulfilled immediately the Specifications are published.

COMPLETE SPECIFICATIONS ACCEPTED

Open to public inspection on March 23 1960

Howards of Ilford Ltd. Process for dyeing polyamide or polyalkylene terephthalate fibres. 831,141.

Courtaulds Ltd. Manufacture of threads, fibres, filaments and the like from viscose. 831,065.

Dunlop Rubber Co. Ltd. Cross-linking liquid copolymers of diolefines. 831,061.

Farbwerke Hoechst A.G., Vorm Meister, Lucius and Brüning. Process for the manufacture of polythene polysulphide. 831,143.

Soc. Industrielle De La Cellulose (Sidac) S.A. Film-forming composition with plasticizer. 831,120.

Farbwerke Hoechst Aktiengesellschaft Vorm. Meister, Lucius, and Brüning. Process for producing shaped articles from polyethylene. 830,924.

Farbwerke Hoechst Aktiengesellschaft Vorm. Meister, Lucius and Brüning. Process for working up polyolefines. 831,123.

Badische Anilin- and Soda-Fabrik A.G. Production of solid polyethylene. 831,145.

General Electric Co. Peroxide cured polythene. 831,126.

Farbwerke Hoechst Aktiengesellschaft Vorm. Meister, Lucius and Brüning. Manufacturing of copolymers of acrylonitrile. 830,898.

Bristol-Myers Co. Cosmetic compositions and preparation thereof. 830,973.

Phillips Petroleum Co. Process and apparatus for recovering polymers. 830,974.

Food Machinery and Chemical Corporation. Resin coated glass-reinforced plastics. 830,975.

General Electric Co. Irradiated polyethylene. 830,899.

R. Wucher. Apparatus for injection moulding plastic materials. 831,192.

B. F. Goodrich Co. Stable latices and preparation thereof. 830,931.

Imperial Chemical Industries Ltd. Laminated thermoplastic polymeric materials. 830,901.

Vereinigte Glanzstoff-Fabriken A.G. Process for the production of regenerated cellulose threads from viscose. 831,078.

W. Schelkmann. Method for rebuilding and repairing automobile tyres. 830,933.

T.I. (Group Services) Ltd. Chlorination of polymers. 831,150.

E. I. Du Pont De Nemours and Co. Production of regenerated cellulose from viscose. 831,081.

Phillips Petroleum Co. Process for recovering monomers from hot latex emulsions. 830,082.

H. Freudenberg and R. Freudenberg, trading as Freudenberg Komm. Ges., Auf Aktien, C. Process for the properties of sheet structures consisting of cellulose-containing fibres. 830,904.

General Aniline and Film Corporation. Adhesive composition and products coated therewith. 830,938.

Phillips Petroleum Co. Polymerization process for olefins. 831,089.

B. F. Goodrich Co. Preparation of granular polymers of vinylchloride. 830,939.

NEW COMPANIES

ADD NEW COMPANIES — — —

F. Rosendale Ltd. (652,632).—March 15. Capital: £2,000 in £1 shares. To carry on the business of manufacturers of and dealers in rubber tyres, etc. The directors are: Fredrick Rosendale, 1 Bonner Road, E.2, and Frederick J. Rosendale, 33 Duncombe Road, N.19. Regd. office: 8 The Crescent, Minories, E.C.3.

Benjamin Kay and Co. (Birmingham) Ltd. (652,562).—March 15. Capital: £2,000 in £1 shares. To carry on the business of merchants of and manufacturers in leathercloths, plastic materials, rubber and rubberized materials, etc. The directors are: Benjamin Kay, 11 Limefield Road, Salford 7, and Harold L. Wise, Pound Cottage, Hanbury, near Bromsgrove. Regd. office: 414 Bearwood Road, Smethwick, 41.

Film Converters Ltd. (652,409).—March 14. Capital: £5,000 in £1 shares. To carry on the business of converters of and dealers in transparent cellulose or other plastic film of any kind, etc. The first directors are to be appointed by the subscribers. Solicitors: Clifford-Turner and Co., 11 Old Jewry, E.C.2.

North Liverpool Tyre Co. Ltd. (652,358).—March 11. Capital: £1,000 in £1 shares. The directors are: Arthur R. Moore, 12 St. Philip's Avenue, Liverpool 21; Arthur C. Modlin, 32 Mersey View, Liverpool 22. Regd. office: 5 Aintree Road, Liverpool 20.

Matband Ltd. (652,278). — March 11: Capital: £100 in £1 shares. To carry on the business of manufacturers of and dealers in tyres, etc. The first directors are to be appointed by the subscribers. Secretary: Thomas A. Herbert.

Grandliam Ltd. (652,329). — March 11. Capital: £100 in £1 shares. Other particulars are similar to Matband Ltd. (q.v.).

Levine Plastics Ltd. (652,480).—March 14. Capital: £12,000 in £1 shares. To acquire the business of manufacturers, makers and merchants of and dealers in waterproof and rainproof clothing now carried on by Cohen and Weinstock Ltd., as "Levine Plastics" and formerly carried on by H. Levine (Plastics) Ltd., at Talbot Mill, Ellesmere Street, Manchester and elsewhere, etc. The directors are: David Cohen and John Cohen, both of 65 Singleton Road, Salford, 7; Philip Cohen, 57 Woodlands Road, Crumpsall, Manchester. Regd. office: Weathergay House, New Bridge Street, Manchester.

Fibreglass Mouldings (Yorkshire) Ltd. (652,408).—March 14. Capital: £100 in £1 shares. To acquire the business of plastic design, moulding, fitting and finishing carried on by Idle Engineering Co., at Worsborough Dale, Barnsley, etc. The permanent directors are: Peter Idle and Iris K. Idle, both of Kirk Knowle Grange, Worsborough Dale, Barnsley; Peter Brook, 48 Chapel Street, Birdwell, Barnsley. Regd. office: Kirk Knowle Grange, Worsborough Dale, Barnsley.

S. Dugdale, Son and Co. (Plastics) Ltd. (652,435).—March 14. Capital: £36,000 in £1 shares. To carry on the business of manufacturers, processers or converters of all kinds of goods made wholly or partially from plastic materials, etc. The first directors are to be appointed by the subscribers. Solicitors: Addleshaw, Sons and Latham, Manchester.

Thames Structural Plastics Ltd. (652,198).—March 10. Capital: £100 in £1 shares. To carry on the business of manufacturers of and dealers in fibreglass, plastic, bakelite and all similar materials and moulds for the conversion of the same into accessory parts for boats and sailing vessels of all kinds, motor cars, etc. The directors are: Leonard A. D. Wakefield, 57 Sydervelt Road, Canvey Island, Essex; Raymond Walsh, 54 Burnham Road, Leigh-on-Sea. Regd. office: Building No. 7, Rawreth Industrial Estate, Rawreth Lane, Rayleigh, Essex.

TRADE MARKS

Objections to the registration of any of the undermentioned applications may be lodged with the Comptroller-General of Patents, Designs and Trade Marks at the Patent Office, 25 Southampton Buildings, Chancery Lane, London, W.C.2, within one month of the date mentioned. The objections must be stated on Trade Marks Form No. 7, cost £2, obtainable through any money order office. The extracts—from 'The Trade Marks Journal'—given below are reproduced by permission of the Controller of H.M. Stationery Office.

DAPON

(796,222) Synthetic resins for use in manufactures. Food Machinery and Chemical Corp., 161 East 42nd Street, New York 17, State of New York, USA. Address for service is c/o J. E. Evans-Jackson and Co., 49 Albert Hall Mansions, Kensington Gore, London, S.W.7. (Class 1; February 23 1960).

DINETTE (794,701) Chemical products for use in the manufacture of plastics. Dinette Ltd., 12 Dock Street, London, E.1. (Class 1; February 23 1960).

SPANDOFOAM (795,448) Chemical substances used in the manufacture of foamed plastics. The Baxenden Chemical Co. Ltd., Clifton House, 83-117 Euston Road, London, N.W.1. (Class 1; February 23 1960).

NATCo

(792,170) Drilling, reaming, tapping, boring, facing, milling and plastics injection moulding machines. National Automatic Tool Co. Inc., South 7th and "N" Streets, Richmond, USA. Address for service is c/o Stevens, Langner, Parry and Rollinson, 5 to 9 Quality Court, Chancery Lane, London, W.C.2. (Class 7; February 23 1960).

FIBRON (794,761) Measuring tapes made from material composed of glass fibres impregnated with plastics, for use by workmen, surveyors and the like. John Rabone and Sons Ltd., Hockley Abbey Works, Whitmore Street, Birmingham, 18. (Class 9; February 23 1960).

PLASTESTRIP

(787,941) Extruded plastics included in Class 17 in strip form. Caravans and Components Ltd., Speedway Estate, Lea Bridge Road, Leyton, London, E.10. (Class 17; February 23 1960).

Bry

(793,115) Materials for packing (jointing) and insulating; and hose pipes (non-metallic). British Nylon Spinners Ltd., Pontypool, Monmouthshire. (Class 17; February 23 1960).

SPANDO (795,831) Plastics included in Class 17 in the form of sheets, slabs, rods, tubes, foils and shaped sections; articles included in Class 17 made from the aforesaid goods; and insulating materials. The Baxenden Chemical Co. Ltd., Clifton House, 83-117 Euston Road, London, N.W.1. (Class 17; February 23 1960).

PLAYTEX CONTOURETTE

(790,247) Dresses and waterproof pants sold in sets, and shirts and waterproof pants sold in sets, all for infants; brassieres, corsets, corselettes, girdles (foundation garments), suspender belts, stockings and socks (for wear); and panties being articles of clothing for women. International Latex Corp., Playtex Park, Dover, USA. Address for service is c/o Stevens, Langner, Parry and Rollinson, 5 to 9 Quality Court, Chancery Lane, London, W.C.2. (Class 25; February 23 1960).

R·J·I·P CLASSIFIED ADVERTISEMENTS

Classified Advertisements may be displayed under each heading at £3 per inch, single column. Write or phone for details.

APPOINTMENTS VACANT

CHEMIST, age 35 to 40, or other technologist, with management ability and preferably with experience of foamed plastics or foamed latex for works in North-West England. Failing this, experience of development work in the chemical or plastics industries and of practical implementation of results. Ability to lay down process procedures and supervise their implementation. Sufficient commercial flair to be able to decide priorities on own responsibility. Young and growing company; rapid expansion proposed. Salary £2,000, plus percentage interest in profits.—Apply in writing to O. W. Roskill, Industrial Consultants, 14 Great College Street, London, S.W.1. (198)

AMBITIOUS plastic injection mould designer, preferably with good technical qualifications, wanted by old-established progressive company who can offer an exceptional opportunity for advancement with good salary and conditions, pension scheme and permanency.—Apply Works Director, Paton, Calvert and Co. Ltd., Binns Road, Liverpool, 13. (202)

A MIDLAND rubber company requires graduate chemists, with or without a knowledge of rubber technology for interesting and responsible work in their development department and laboratory. Salary dependent upon qualifications and experience.—Box 204. (204)

APPOINTMENTS VACANT

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Candidates should write giving age, details of education and experience, together with a short summary of the reasons why they believe they would be effective in this post to:

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THE DISTILLERS COMPANY LIMITED
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LONDON W.1.

Quote Ref: 26/60 R.J. (196)

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